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ELEMENTS OF UTILITY
RATE DETERMINATION

ELEMENTS OF UTILITY RATE DETERMINATION

BY

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PREFACE

This text has evolved from a lecture course in valuation and rates for public utilities given by one of the authors to graduates and select senior students in engineering at the universities of Texas and Minnesota during the past twenty years, and from the practical experience of the other author as rate engineer for the Northern States Power Company, Minneapolis, Minn.

The background of this text is found in the accumulation of the records of rate cases decided by Federal and state commissions and of the appeals decided by state and Federal courts and the United States Supreme Court, although the approach of the authors has been that of the engineer rather than that of the lawyer, accountant, or economist.

For illustrative material and definitions, the authors have used numerous citations from background and key cases decided by commissions and courts. In addition, many other cases are cited in footnotes for further study and reference.

Inasmuch as the subject of public-utility regulation is such a broad one, any attempt to cover the entire field would mean an endless task, and for that reason the authors have attempted to cover essential points only, leaving out of consideration any controversial issues and discussions of untried theories.

Additional information on the subject may be found in texts covering particular fields, some of which are the following: Nichols, "Public Utility Service and Discrimination"; Welch, "Cases on Public Utility Regulation"; Spurr, "Guiding Principles in Public Service Regulation," 3 volumes; Pond, "Public Utilities"; Ruggles, "Problems in Public Utility Economics and Management;" and Bauer and Gold, "Public Utility Valuation."

The text is intended to be used as reading material and as a reference in a lecture course on utility-rate determination rather than as a case book on the subject. Such a course has been given successfully to a mixed group of graduate students of engineering, law, economics, business administration, and political

science. The text is also intended as a reference book for public-utility executives, engineers, and those engaged in the operation or in the commercial departments of public utilities.

Grateful acknowledgment is made by the authors to all those who have assisted in any manner in the preparation of this book.

J. M. BRYANT,
R. R. HERRMANN.

MINNEAPOLIS, MINN.,
April, 1940.

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ELEMENTS OF UTILITY RATE DETERMINATION

CHAPTER I

INTRODUCTION

General.—Before discussing the problem involved in establishing rates for various utility services, a brief statement pointing out the essential factors involved and the relative differences that distinguish utilities from other kinds of businesses is advisable. Utilities are constructed for one specific purpose, as, for example, transportation, communication, or water supply. There are usually no “middle men.” The raw product is transformed into the finished product and delivered to the customer. Water is obtained from wells, rivers, or lakes, then filtered and purified, and finally delivered to the consumer over property belonging to the utility. No separate and distinct transportation company is engaged to transport the water. In other businesses the process of preparing an article of commerce and getting it into the hands of the consuming public is divided among the producers of the raw materials, the manufacturers, the wholesalers and jobbers, and finally the retailers. One of the general lines of business which comes close to the general scheme of utilities is that of an oil company which owns oil wells, refines the oil, and transports it with its own trucks to its own filling stations.

Some kinds of business have a “turnover” of their capital from a few times to ten and twelve times per year. A storekeeper may have \$10,000 invested in stock, and if his sales amount to \$100,000 per year his turnover is ten times. If, however, the entire capital devoted to his business were considered, the turnover would probably be less than once every year. Suppose that all the restaurants in a given city are owned by one person and that the same person also owns (1) sufficient farms to produce all the food-stuffs required, (2) a meat-packing plant, (3) a flour mill, etc., the

entire investment in such instance would correspond, roughly, to the investment of a utility, and the amount of income derived from the sale of meals would correspond to the sale of utility service. Instead of investing in a building, the restaurant operator rents or leases a building or portion thereof and pays a monthly rental. He purchases his foodstuffs from grocerymen and others engaged in that business. In other words, the responsibilities for the continuous flow of foodstuffs from the farms to the patrons of the restaurants together with their preparation are divided among a great many parties.

With utilities, the responsibilities are divided among only a few and sometimes rest upon only one. When a water utility owns everything necessary to supply pure water to the inhabitants of a city, except the coal mines that supply the fuel necessary to generate power to pump the water, the utility, coal mine, and intervening transportation system are responsible. If the water is pumped by means of a hydroelectric plant owned by the water utility, there is only one party responsible. Furthermore, the equipment can rarely be devoted to any other purpose. A building constructed for a restaurant can be utilized in some other way. A steam power plant can hardly be used for any purpose other than the generation of power.

Because of the large investment per unit of product sold, the turnover is once in several years. The utility must pay all operating expenses and a return on this large investment from the amount received from customers. On the assumption that the investment of a utility is \$1,000,000 and that the interest amounts to \$60,000 per year, taxes 2 per cent annually, and the operating expenses other than taxes \$100,000 each year, it is at once seen that the utility must collect \$180,000 each year from the sale of its service. A lowering of the rates by 5 per cent would reduce the earnings by \$9,000, and, if all expenses except interest remain the same, the amount for interest would be reduced to \$51,000, the result being 5.1 per cent instead of 6 per cent.

Instead of obligating itself to pay a fixed amount of \$60,000 as interest, the utility would probably sell bonds for \$500,000 at some lower rate than 6 per cent, let us assume at 4 per cent, and sell stock to get the remaining \$500,000. If a return of 6 per cent is permitted, the stockholders would get the difference between

\$60,000 and the bond interest (\$20,000), or \$40,000, and thus get a return of 8 per cent. A reduction in rates of \$9,000 would reduce the amount for stockholders to \$31,000, or 6.2 per cent. Although the rates are reduced only 5 per cent, the return to stockholders is reduced by 22 per cent.

The ratio of operating expenses to revenue obtained is known as the "operating ratio." In the example above, this ratio (when taxes are included) is \$120,000 divided by \$180,000, or 66 $\frac{2}{3}$ per cent. Other factors remaining the same, an increase in expenses or a decrease in rates will increase the operating ratio. Because of the relationship between investment and units of product sold, whereby, during a given situation, an additional amount of product can be made and sold without a corresponding increase in investment, the return to the stockholders may remain the same if the amount sold is increased. For instance, if the utility after lowering its rates from \$180,000 to \$171,000 (5 per cent) could increase its sales by \$16,000 at an additional expense of only \$7,000, the extra \$9,000 would make up the loss due to rate reductions.

A utility which can do this is in a much more fortunate position than one which cannot. It is doubtful whether a water utility could increase the sale of water to the extent that would offset a reduction in rates of 5 or 10 per cent. A transportation system may be able to do so. Electric utilities in this country have been increasing their residential and commercial sales of electricity continuously for a great many years, and during this same period the average rate per kilowatt-hour charged has constantly become less. The picture of a utility that is expanding differs materially from one that has reached its maturity. The former can expect, by expanding its business, to recoup moderate losses caused by rate reductions or increased operating expenses, whereas the latter is unable to do so. Coupled with the actual out-of-pocket expenses is the amount to set aside for depreciation. This factor is not definite or the same for all utilities or for the same kind of utility in all parts of the world. Since all these factors have a bearing on the rate question, it is little wonder that disputes concerning adequate and reasonable charges for service are often long-drawn-out affairs and their records voluminous.

Definitions of Engineering Terms.—Experience in conversing with people in general indicates that the "man in the street" has

only a meager knowledge of engineering terms. Since some knowledge of such terms is necessary to comprehend the subject of utility regulation and its affect on rate making, we shall take the liberty to include a few definitions as follows:

Force.—In the English-speaking countries where no metric system is in vogue, the unit of force is the pound. If we suspend a 1-lb weight by means of a string from the hand, a force of 1 lb is exerted by the weight upon the string and the string in turn exerts 1-lb force upon the hand. The same force could be exerted by the string upon the hand if the string were fastened to the floor and the person pulled upward with the same exertion used to hold the weight. No weights are involved; yet the force of 1 lb is exerted by the floor upon the string and by the string upon the hand, or, vice versa, by the hand upon the string and the string upon the floor. The idea that weight is necessary has been dispelled. Our conception has enlarged so that the idea of force has come to include the tension, or pull, in the string. Suppose the weight rested upon a small table weighing 10 lb, the table would exert an upward force of 1 lb against the weight and a force of 11 lb against the floor. One might place his hand upon the table and exert sufficient pressure so that the table would again exert a force of 11 lb against the floor. The table would be under a compression of the same amount in either case. No motion is necessary to continue the action of the force, although some motions were necessary up to the time the force was applied.

Work.—Suppose the person referred to in the preceding paragraph lifted the 1-lb weight from the floor by means of the attached cord and placed it upon the table, which is 2 ft 6 in. above the floor. He would have done $2\frac{1}{2}$ ft-lb of work. A man lifting 1 lb a distance of 3 ft does 3 ft-lb of work and if he lifts 3 lb through a distance of 1 ft he does the same amount.

Unless pointed out, one peculiarity may be overlooked. The force exerted by the weight is in the same direction at all times, *viz.*, vertical; the movement may not be. That is, the weight may be lifted vertically up to the height of the table top and then moved horizontally. While being lifted vertically the motion is in the same direction as the force, and when moved horizontally it is at right angles to it. In this particular case the horizontal motion does not affect the amount of work done. The work done is equal to the product of the weight in pounds and the

vertical distance in feet, through which it is lifted. To calculate the work done, one must multiply the value of the force exerted, by the distance the force was moved through, in the same direction as that in which the force is exerted.

Energy.—Energy, work, and foot-pounds have the same concept. The units of energy are many. Energy may be expressed in foot-pounds, kilowatt-hours, or horsepower-hours. A definite horsepower acting for a definite time gives energy, and the horsepower multiplied by the hours during which it acts gives horsepower-hours. If the power is expressed in kilowatts, the energy in kilowatt-hours is obtained by multiplying the power in kilowatts by the time in hours. One horsepower-hour equals 0.746 kwh.

One must remember that more power is required to do a certain amount of work in a short time than in a long time. A tremendous amount of power is released in a lightning flash, although the energy is not great, because of the short time during which it acts.

Another unit of energy commonly used by engineers is the British thermal unit, commonly expressed as Btu. It is the heat necessary to increase the temperature of one pound of water through one degree Fahrenheit. The relation between Btu and foot-pounds has been determined by experiment. From this the relation between Btu and kilowatt-hours has been derived. One kilowatt-hour equals approximately 3412 Btu. One pound of Pocahontas coal contains about 14,000 Btu. The corresponding unit in the centimeter-gram-second (metric) system is the calorie.

There are many forms of energy. These can be classified as kinetic and potential. Potential energy is equal to the work a body (or system of bodies) is capable of doing because of its (or their) position or condition. When the weight operating a clock is pulled up to its highest position, it has more potential energy than when at its lowest position, and in dropping from its highest to its lowest point the potential energy lost by the weight has been used in operating the clock. The water at the crest of a dam possesses energy, and in passing through a turbine the energy of the water is converted into electrical energy by means of a water wheel and an electric generator.

Kinetic energy is equal to the work a body is capable of doing because of its motion. When a ball is thrown vertically upward,

the kinetic energy at the moment of release is sufficient to carry the ball upward to a height where the weight of the ball multiplied by the height through which it rises equals the kinetic energy at release (less any losses such as those due to air friction).

When a gas is in a container under pressure, it possesses potential energy and is able to do work when allowed to expand. The burning fuel under a boiler changes the water into steam, and as more heat is applied more water is evaporated; this causes an increase in steam pressure. When the steam is allowed to expand in an engine or turbine, the heat energy in the steam is converted into mechanical energy; and if the engine or turbine drives an electric generator, the mechanical energy is converted into electrical energy.

The ordinary terms involving pressure are "pounds per square inch," "inches of water," or "inches of mercury." A cubic foot of water weighs approximately 62.5 lb. If we visualize 1 cu ft of water as consisting of 144 columns each 1 in. square and 1 ft high, the pressure on each square inch is readily determined by dividing 62.5 lb by 144, giving 0.434 lb. Hence, 12 in. of water result in a pressure of 0.434 lb per square inch. Mercury is about thirteen times as heavy as water, and so the pressure exerted by 1 in. of mercury is about thirteen times as great as 1 in. of water. The height of the water between the high and low points at a water fall is referred to as the "head" or "difference in head." The pressure against the bottom of a dam when the distance to the surface of the water is 50 ft is 21.7 lb per square inch.

Atmospheric pressure is due to the weight of the air above the earth. It is about 14.7 lb per sq in. at sea level and less at higher altitudes.

When steam at 200 lb per sq in. pressure is allowed to enter the cylinder of a steam engine 10 in. in diameter, the total pressure is the area of the piston (78.54 sq in.) multiplied by 200, or 15,708 lb. If the atmospheric pressure on the other side of the piston is reduced (as can be accomplished by a condenser), the effective pressure is increased above 200 lb per sq in.

Power.—Force and power are often used incorrectly. Power is defined as the rate of doing work. If a hoisting engine lifts 33,000 lb through a distance of 1 ft in 1 min, the power necessary is equal to 1 hp. Likewise, 1 hp is required to lift 1 lb through

33,000 ft each minute, or 3 lb through 11,000 ft each minute. Expressed mathematically, horsepower is

$$\text{Hp} = \frac{\text{force} \times \text{distance}}{33,000 \times \text{minutes}}$$

For example, if a horse weighing 1,500 lb is pulling a load at the rate of $2\frac{1}{2}$ mph, with a horizontal tension in the tugs equal to one-tenth his weight, the power expended is 1 hp. The force is 150 lb. The distance is $5,280 \times 2\frac{1}{2}$, or 13,200 ft. The time is 60 min. The horsepower is, therefore,

$$\text{Hp} = \frac{150 \times 13,200}{60 \times 33,000} = 1.$$

(Force in pounds multiplied by distance in feet and this product divided by 33,000 times the number of minutes.)

There is another unit of power, *viz.*, the kilowatt. One horsepower is equal approximately to $\frac{3}{4}$ (0.746) kw. The kilowatt is derived from the centimeter-gram-second system, in which distances are measured in centimeters and weights in grams.

Amperes, Volts, and Watts.—The “volt” is the unit of electrical pressure that causes electricity to “flow” in a wire or other medium. Voltage is analogous to the difference in water pressure between two points in a water pipe or main. When this difference is great, more water flows than when it is small.

The “ampere” is the unit of current flowing in the wire which corresponds to the rate of flow of water in a pipe. The larger the difference in voltage between two points on a wire, the greater is the amperage.

The “watt” is the unit of power, and in d-c systems it is the product of volts and amperes. A 50-watt lamp operated at 115 volts has $50/115$ amp flowing through it. With a-c systems the power is not always equal to the product of volts and amperes. To obtain the power, this product must be multiplied by the “power factor” which is never greater than 1. The ordinary power unit is the “kilowatt” which equals 1,000 watts. A steady flow of power equal to 1 kw for 1 hr gives 1 kwh of energy. Some prefer the term “electrical unit” because of the persistency of

the public (and some who should be better informed) in using the term "kilowatts" when the word "kilowatt-hours" should be used instead.

Efficiency.—When energy is converted from one form to another, the output of power is never more than the power supplied. The ratio of power taken out to power supplied is known as "efficiency."

An electric motor transforms electrical energy into mechanical energy, and, because of losses in the motor, the mechanical power is less than the electrical. Suppose a steam generating plant uses 1.5 lb of Pocahontas coal for each kilowatt-hour generated. The 1.5 lb of coal contain 21,000 Btu, and 1 kwh contains 3412 Btu. The efficiency of energy conversion is 3,412 divided by 21,000, or 16.2 per cent.

When 1,000 cu ft of water flow through a water turbine each second at a dam where the difference in elevation (difference in head) between water on the upstream and downstream sides is 100 ft, the horsepower of the falling water is calculated as follows:

$$\frac{1,000 \times 62.5 \times 100}{33,000} = 11,363 \text{ hp.}$$

If the efficiency of the water wheel is 80 per cent, the mechanical power becomes 80 per cent of 11,363, or 9,090 hp.

Fundamental Characteristics.—Utilities are mainly transporting agencies. Railroads carry passengers and freight, telephone and telegraph utilities transport messages, water utilities transmit water, electrical utilities transmit power, etc. The fundamental carriers today are railroads, trucks, and waterways. Gas may be made from coal and then carried to the consumers through pipes. Electrical energy may be transmitted from hydroelectric plants to cities. When the over-all cost of the hydroelectric development with its attendant operating expense is greater than that of a steam plant requiring much less electrical transmission, it is, of course, uneconomical to construct such a hydroelectric plant. A little reflection will reveal the extent of the relationship between all utilities, how a change in freight rates on coal may justify a hydroelectric development or how the transportation cost of fuel oil may cause a prospective user to

buy central station power. When it is cheaper to transport coal to a location where power is needed than it is to transport electrical energy over wires from the source of fuel supply, an electrical transmission line cannot be justified economically. The efficiency of transmission with the accompanying cost of conversion from one form to another also affects the economics of the situation and in many instances is the deciding factor.

In the ordinary business world, with free action and competition, the business that operates the most efficiently is able to undersell its competitors and by so doing can expand. Regardless of the money invested in a particular business, the selling price is determined by competition. With utilities, the same situation does not exist in its entirety, which is the reason why regulation has been adopted as the means of securing reasonable rates and charges for utility services. Investments in a utility plant cannot be returned quickly; instead they are amortized by a depreciation charge over a considerable time, during which many changes may occur, both in the demand for the service and in the technical operation of the utility. The uncertainty of the future makes the investment in some utilities more of a risk than in others.

Because of physical limitations, utilities are not able to make charges in accordance with all or even a majority of the factors entering into the cost of service. A water utility may charge according to the amount of water supplied to a customer; yet its cost of supplying the water is made up of a great many other elements, mainly fixed charges, which do not vary greatly with the quantity consumed. An agreement whereby charges are made on volume consumed and nothing else is similar to an agreement to keep a particular automobile in readiness for a patron without any other charge than one based on mileage, the injustice of which becomes apparent when the car is driven very little each month. A more equitable charge would be one made up of two parts, a fixed charge to return interest and depreciation and a second based on the mileage the car is operated.

Valuation of Utilities.—The placing of a fair value on utility property for the purpose of establishing the rate base is difficult to accomplish with exactness. An estimate might be made of the cost to reproduce the existing property, but, when some of the property is very old, it may be practically impossible to reproduce

it exactly without enormous expense. Reproduction cost does not mean exactly that. It is the estimate of competent engineers as to what it would reasonably cost to construct the existing property at the present time, on the assumption that the necessary material were available. Often the value used is of a system to duplicate the service by using available material and machinery of a similar kind. Prudent investment requires that inquiry be made as to the business judgment of those originally making the investment. As "hindsight is better than foresight," a figure so obtained is again an estimate. Book cost may be obtainable; but when a property has passed through several hands, this figure cannot be relied upon.

It appears that all that the public desires to know is what it would cost them as a group and individually to secure the service by some other method. In other words, if free competition prevailed, what would the charges be? After all is said and done, it is extremely unlikely that a group of users would construct a utility system to supply their wants if the majority believed that their costs would be increased by so doing. Therefore, it appears that all factors should be considered, weight being given to each one as the facts in the case merit. In some utilities where it is almost self-evident that the service cannot be supplied as economically in any other manner (as in the case of water utilities), reproduction cost of existing facilities should be the factor given the greatest weight.

In other words, one specific method, such as original cost, prudent investment, or any other, cannot be applied to *all* classes of utilities. *All* factors, such as valuations based on the several methods, the interest rate of money, and useful life of the property, should be considered and given proper weight when a decision as to the reasonableness of rates is to be made. An individual operating a factory decides whether it is better for him to purchase water than to drill his own well, whether he should use gas or some other fuel, etc. To carry the thought further, a group of users of any particular product, as, for example, a community, can likewise make an investigation to determine whether they, as a group, can secure the service rendered by a utility at a lesser cost by some other means.

On the assumption that, if the group owned and operated the utility itself, it would be securing service at cost (excess profits

would go to the general treasury of the group and losses would necessarily be paid out of the general treasury), the logical sequence is to assume that, if the privately owned utility renders service at cost, the group is treated fairly. Hence, it naturally follows that the determination of the cost of furnishing the service is the object sought.

However, if the group believes it can secure the same or similar service by some other means at lesser cost and if at the same time it is also aware of the fact that the present service is being rendered by the private utility at cost, it might, none the less, decide to make the change. The utility may meet the price level required, even though doing so may mean an insufficient return on its investment or even an actual operating loss. During business depressions, equipment may be purchased at lower prices and the labor necessary to install it may be much lower than formerly. Prevailing interest rates are usually lower during such periods. If a utility must meet the theoretical competition caused by such conditions, does it not seem equally logical that it be permitted to make the same charges as a similar plant during business booms? Such reasoning favors the reproduction cost theory of valuation or, better still, the "minimum reproduction of the identical service" cost theory.

The latter may mean (as in the case of a water utility) the reproduction of the actual equipment. Water mains are not much different today from what they were many years ago. They must be laid below the frost line today as 50 years ago; the cost of digging trenches may be different today; the source of the water may be adequate for years to come. What argument can be made against the adoption of the reproduction cost in such an instance?

On the other hand, a manufactured-gas system may be antiquated as far as its manufacturing equipment goes. Natural gas may be available, so a portion of the equipment (gas producing) may no longer be necessary. Hence, we have the phrase "valuation of the property 'used and useful.'" Here again is the "minimum reproduction of the service" idea. It is not a "reproduction of the property" but a reproduction of *necessary* property. Many other examples might be cited. These two are given to bring out the fact that one theory alone will not be satisfactory in all cases.

Depreciation.—The reader must distinguish between the dictionary definition of depreciation and the various meanings of the term when applied to utility property. To depreciate means to fall in value, *i.e.*, to become worth less. As the rates for service are predicated on the worth or value of the property, it is at once apparent that this definition cannot be used without modification in speaking of utility property. Value and earning power are very closely related in the thoughts of the “man in the street.” An old building is not so desirable as a new one, for offices, let us say; hence, as a building becomes older its earning power becomes less, and therefore there is a drop in value known as “depreciation.”

With utility property this condition does not generally obtain. A water reservoir may be in as good condition today as it was 25 years ago. Copper wires in a transmission line are able to carry electricity today as easily as when first erected. In other words, the capability to function is as good today as it ever was. The wooden poles that hold the wires do, however, deteriorate and must be replaced at some time (continued use being assumed). A utility should, therefore, set aside periodically a sum of money to offset the wearing out of the property so that, when necessary, the fund accumulated can be drawn upon to replace the worn-out property or to be returned to the investors.

The amount to set aside annually, whether the valuation of the entire property should be considered equal to the original cost less the amount accumulated in the depreciation (or replacement) reserve, and other points have been the causes of almost endless controversy. When it is remembered that the future is uncertain and that no one can predict with accuracy how long a particular piece of equipment will last, one can readily see how considerable controversy might arise in determining the amount to set aside annually to take care of an unknown situation. Too small a depreciation charge means that the investors of a private utility are being deprived of a portion of their capital and, in the case of a government-owned utility, that the future generations will be paying for something used up by the past and present generations.

Financing.—No chapter has been devoted to financing because, if proper charges must be determined from value of property

used and useful, operating expenses, and the amount to allow as return, it makes no difference how the enterprise was financed, how much it has been "written up," or how much the present owners may have paid for all or a portion of it. Some writers contend that a high capitalization results in poor service and higher rates. With a proper determination of the valuation of the property, it is doubtful whether such a situation would continue very long.

The selling of worthless securities is certainly to be condemned. But who is to be the judge in a new venture? May not governmental bureaus and commissions, charged with the duty of passing on securities, prevent the sale of those which appear too speculative but which, later on, would pay handsome dividends? Or may not the reverse be true? Perhaps a security issue approved by such a commission may decrease in value because of changes in the art or because of changes in laws. These and other considerations have caused the authors to forego a treatment of financing in this book.

Government vs. Private Ownership.—Arguments concerning publicly owned as against privately owned utilities have purposely been avoided. Debates on the relative merits of the two systems embrace a variety of subjects including politics and social benefits. A utility system consists of machinery and other equipment and requires people to operate it. With facts concerning these two main elements, conclusions as to the reasonableness of the charges should be reached, regardless of who may happen to be the owner of the property.

Miscellaneous.—The reader is cautioned against applying the same meaning to some words and phrases used in connection with utilities, which apply to competitive business. "Discrimination" is one of these words. Some discrimination may be unlawful or unreasonable. Some may be lawful or reasonable. If a particular discrimination produces benefits to all customers, what harm results? The greatest good to the greatest number (on the assumption that someone knows what is the greatest good) should be a guide in policy determination.

In the following chapters the reader should bear in mind that the whole subject is not an exact science, that regulation effected by human beings with all their weaknesses and strong points is

not perfect, and that injustices may exist. A workable method is to be preferred to no method at all even though it may be cumbersome and there may be some injustice.

The relative importance of any utility service in the expenditures of an individual or community as compared with expenditures for food, clothing, housing, pleasure, etc., is a topic that has purposely been avoided. The relative smallness of the cost of any particular service to the public has little effect on the reasonableness of the cost of such service.

SECTION I

VALUATION

CHAPTER II

THE RATE BASE

Definitions.—In order to continue to render adequate service of good quality, a utility must receive sufficient income from the service it renders to provide for three factors: (1) enough to enable it to pay its operating expenses; (2) enough to enable it to lay aside a sufficient sum to offset the value of the property “used up” in rendering the service; and (3) enough to pay a fixed amount to the persons whose money is invested in the business, an amount usually referred to as the “return.” The last of these three factors requires a determination of the amount upon which the return is to be calculated, usually referred to as the “rate base” or the “value of the property,” so that, before the proper service charges, tariffs, or rates can be determined, it is necessary to determine the *rate base*. The present method for the determination of the rate base has been laid down by practice under rules prescribed by state and Federal commissions and passed upon in numerous cases before the highest state courts, the lower Federal courts, and the United States Supreme Court.

The earliest charges for service were fixed by the railroads, grain elevators, and other corporations rendering public service, and without review by any public authority. In a few cases, rates were established by special acts of state legislatures, but, as the number of corporations grew larger, these special bills became too numerous for proper consideration by such bodies. No uniformity existed, no general rules or definitions were laid down, and there was no review made by the higher courts until the case of *Munn v. Illinois* and the so-called Granger Cases in 1876.

In the case of *Munn v. Illinois*, 94 U.S. 113, 24 L. ed. 173, decided October, 1876, and in the Granger Cases (*Chicago, B. & Q. R. Co. v. Iowa*, 94 U.S. 155) the acts of the legislature regulating the rates for the storage of grain in elevators were upheld by the court on the ground that the property was affected with a public interest and the regulation of the rate of charge was solely a legislative power, the courts being powerless to prevent the abuse of such power by the legislature. This attitude of "hands off" by the courts prevailed until 1886, when Chief Justice White, in the Railroad Commission Cases, 116 U.S. 307, 331, 29 L. ed. 636, 6 Sup. Ct. 334, Jan. 4, 1886, stated: "It is not to be inferred that this power of limitation or regulation is itself without limit. This power to regulate is not a power to destroy, and limitation is not the equivalent of confiscation." Again, in *Chicago, M. & St. P. R. Co. v. Minnesota*, 134 U.S. 418, 33 L. ed. 970, 10 Sup. Ct. 462, Mar. 24, 1890, the court said that it was "necessarily within the power of the courts to declare illegal and unreasonable a rate fixed by a legislature or commission," and also, "There is no hard and fast rule to be followed," stated Justice Brewer in *Ames v. Union Pacific R. Co.*, 64 Fed. 165, Nov., 1894.

This position of the courts was still further elucidated by a decision of Judge Ross, as follows:

In the solution of that problem (the rate base) many considerations may enter, among them the amount of money invested. But that is by no means, of itself, controlling, even where the property was at the time fairly worth what it cost. In my judgment it is the actual value of the property at the time the rates are to be fixed that should form the basis upon which to compute just rates; having, at the same time, due regard to the rights of the public.—*San Diego Land & Township v. National City*, 74 Fed. 79, May 4, 1896, and *San Diego Land & Township v. Jasper*, 110 Fed. 703.

In the appeal of these cases to the Supreme Court, that court ruled, Mr. Justice Harlan writing the decision, 174 U.S. 739, May 22, 1899, and a similar decision being written by Mr. Justice Holmes, 189 U.S. 439, Apr. 6, 1903: "What the company has a right to demand, in order that it may have just compensation, is a fair return on a reasonable value of the property at the time it is being used by the public."

An important rate case came up for consideration in Nebraska, Mr. W. J. Bryan acting as attorney for the state. The decision in this case has served as the "key case" in regard to rate structures, and it is probably the one most often cited. This case cites, in turn, an earlier case decided by the court regarding a toll road in Kentucky. The railroad-case decision is, in part, as follows:

We hold, however, that the basis of all calculations as to the reasonableness of rates to be charged by a corporation owning a highway under legislative sanction must be the fair value of the property being used by it for the convenience of the public. And in order to ascertain that value, the original cost of the construction, the amount expended in permanent improvements, the amount and market value of its stocks and bonds, the present as compared with the original cost of construction, the probable earning capacity of the property under particular rates prescribed by statute, and the sum required to meet operating expenses, are all matters for consideration, and are to be given such weight as may be just and right in each case. We do not say that there may not be other matters to be regarded in estimating the value of the property. What the company is entitled to ask is a fair return upon the value of that which it employs for the public convenience. On the other hand, what the public is entitled to demand is that no more be exacted from it for the use of a public highway than the service rendered to it is reasonably worth.—*Smyth v. Ames*, 169 U.S. 466, 18 Sup. Ct. 418, Mar. 7, 1898; citing *Covington & Lexington Turnpike v. Sandford*, 164 U.S. 578, 41 L. ed. 560, 17 Sup. Ct. 198, Dec. 14, 1896.

The following five additional factors were added to those mentioned in *Smyth v. Ames* in *Spring Valley Waterworks v. San Francisco*, 192 Fed. 137, Oct. 21, 1911:

What it will cost to acquire water of equal quantity and quality from the next most available source; the depreciation of that portion of the plant which is worn by the action of the elements, or shorn of its value by newer, cheaper, and more efficient appliances and machinery; the fact that the plant has a franchise and is a going concern with an established business; appreciation in values since the various properties constituting the plant were acquired; and finally, the result must be the reasonable and fair value of the plant as between the company and the public.

Reiterating its "present-value" rule, as laid down in *Smyth v. Ames*, the court stated ". . . and we concur with the court below in holding that the value of the property is to be deter-

mined as of the time when the inquiry is made regarding the rates." *Willcox v. Consolidated Gas Co.*, 212 U.S. 19, 53 L. ed. 382, 29 Sup. Ct. 192, Jan. 4, 1909. Again, the meaning of the words "fair" and "reasonable," as associated with the word "value" for rate cases, was discussed by the Federal court as follows:

It is impossible to consider the constant use of the word "fair" or the word "reasonable," in connection with value, by all Federal courts of this state (California), in practically every statement of this rule, without feeling that regard must be given to the service performed by the property; that reasonable value and fair value are always and under all conditions the precise equivalent of full actual value, or the value which would be awarded in condemnation proceedings; that the value upon which a fair return is due is the value which, under all circumstances, is fair and reasonable as between the public and the person who has voluntarily devoted his property, or some portion of use thereof, to public convenience.—*Spring Valley Waterworks v. San Francisco*, *supra*.

This was still further discussed in another Federal court case decided in the Eastern territory, as follows: "The value of the plant may depend upon good fortune, upon good judgment, or upon fortuitous circumstances, but in every event, the reasonable value of the property at the time it is used for the public is the value to be ascertained for the purpose of this controversy." *Cumberland T. & T. Co. v. City of Louisville*, 198 Fed. 637, Apr. 25, 1911.

Various methods of valuation of public-utility property were devised by the different courts and commissions to arrive at the present value, as prescribed by the Supreme Court and the various Federal courts. The Interstate Commerce Commission was established by act of Congress to determine the rates for freight and passenger service in interstate commerce under the Interstate Commerce Clause of the Constitution. This commission proceeded with a valuation of the railroads of the country for the purpose of fixing rates, a task that is not yet entirely completed. In 1913 the Congress was considering a bill for further instruction to this commission. The late Senator Robert M. La Follette, chairman of the committee drawing the bill, in *Senate Report* 1290, Feb. 21, 1913, gave the following items to be considered:

(1) Original cost to date, including piecemeal construction, legal services, engineering and architects fees, management and organizing, and discount and brokerage in the sale of stocks and bonds; (2) Cost of reproduction new, reconstruction of all parts at present prices; (3) Cost of reproduction less depreciation, cost of reproduction in present condition, cost less depreciation of every part; (4) Other elements, intangible values, going value, good-will value, franchise value.

These items will be discussed later under several different headings.

Numerous court decisions have elucidated further the important elements and methods of arriving at the rate base. Among these decisions are the following:

"Each valuation case should be determined upon the facts peculiar to it, without yielding to one particular theory to the exclusion of all others." *Brooklyn Borough Gas Co. v. Prendergast*, 7 F. (2d) 628, P.U.R. 1926A, 412. "The Commission in ascertaining and determining utility value for rate making, should not be limited by any one rule or theory, but should give fair consideration to evidence relating to reproduction cost, depreciation, earning capacity, present service condition, investment, service furnished, and any and all other relevant evidence." *Boise Artesian Water Co. v. Pub. Util. Comm.*, 40 Idaho 690, 236 Pac. 525. "Neither historical cost, reproduction cost new, nor repriced value of a former appraisal is an exclusive test in determining a utility rate base, but the amounts arrived at by all of these methods are relevant facts for consideration with discretion in the court to give special weight to any one factor, according to circumstances of the particular case." *Chesapeake & Potomac Tel. Co. of Baltimore v. West*, 7 F. Supp. 214 (1934), 3 P.U.R. (N.S.) 241.

A recent commission decision that embodies many of the methods and considerations for valuation is the following:

Due consideration should be given to all evidence submitted and to all factors entering into consideration in determining the value of public utility property for rate making such as historical cost, reproduction cost new less depreciation, investment, going-concern value, condition of the properties or amount of depreciation existing, economic conditions, satisfactory service to the public, cash working capital required, and materials and supplies.—*Re Southern Bell Tel. Co.* (Tenn. 1935), 6 P.U.R. (N.S.) 466.

Original or Historical Cost.—The original cost of the property of a public utility, as it has been purchased or built and put into

use from year to year, together with proper deductions for parts of the property removed from time to time as they are replaced because of wear and tear and other causes, has been put forth as one method of determining the rate base. This procedure has been used in many cases as the determining factor or as a check on other methods of determination. The importance of using this method is well expressed in a case recently decided by the California Commission:

The historical method of valuation, dominating findings in rate proceedings, is well grounded upon established facts, is not subject to the vagaries of pet theories, unlimited imagination, and abrupt fluctuation of current prices and passing conditions, and, therefore, indicates a truer meaning of value upon which, through the application of rates, a return may be allowed to reimburse the owner for his enterprise and insure the integrity of his capital honestly and prudently invested; and at the same time it prevents unwarranted demands upon the consumer through the projection of future rates on ephemeral values and stabilizes rates so that economic shocks from such changes are reduced to a minimum, it is an economical method where the books of the companies are reasonably well kept, and it is a more rapid procedure insuring quicker compliance with necessities as they arise.—*Re Pacific Gas & E. Co. (Cal.)*, P.U.R. 1934A, 1 or 1 P.U.R. (N.S.) 1.

A common definition of original cost, as used by appraisal engineers, is given in the following:

The cost of the original construction plus all charges against capital proper, under approved accounting principles, for expenses incurred thereafter, and minus all proper credits to capital for the cost of property which has been disposed of or otherwise retired.—*Proc. Am. Soc. Civil Eng.*, Vol. 42, No. 10, p. 1752; cited in *Re Kansas City E. L. Co. (Mo.)*, P.U.R. 1917C, 728.

This system of valuation requires carefully kept records of the company from its inception to the time at which the valuation is to be made. Where the property has started as a small enterprise and has been operating many years under different managements, and perhaps has changed ownership from time to time, this continuity of records is difficult to realize. Policies change with changing ownership or with changes in the accounting system required by the regulatory bodies, and other influences come in to confuse the records. These difficulties have been

recognized in the decisions of the courts and commissions, as indicated in the decision of the New York Commission, Second District, and the Federal court in the following citations:

"The theory will apply nicely to a newly constructed property, adequate for full service and a going concern; in actual cases no records are available to establish the value; much of the original plant has been destroyed; consolidation of several companies has rendered useless duplicate apparatus and pipe lines; extravagance and wasteful methods should be the loss of the owners and not of the public; and ability shown in construction should be rewarded; extraordinary misfortune may have occurred; construction may have been made in a period of abnormality." *Buffalo Gas Co. v. City of Buffalo*, 3 P.S.C. (N.Y. 2d Dist.) 553. "The lapse of many years, the multitude of items making up the total, the wide diversity of present views as to what expenditures should have been or should not be included in the cost of construction, etc., the manner of keeping the company's accounts (although no dishonesty is attributable, inasmuch as no motive is conceivable which at that time tempted to deliberate wrong), and other considerations have so obscured the question of the cost of the plant as to greatly weaken the value of this inquiry, laborious and painstaking as it appears to have been. Consideration of these contentions between the parties in connection with the master's findings, the exceptions thereto, and the large mass of testimony directed to the subject of cost of plant, will demonstrate the extreme difficulty of reaching a satisfactory conclusion upon the subject upon any very reliable theory, and the fact becomes apparent that its cost, under the complications presented in the record, would furnish a fallacious test of the actual present value of the company's plant and property in this city where it is being used for the public." *Cumberland T. & T. Co. v. City of Louisville*, *supra*.

In the case of new properties coming under the supervision of a commission from their inception and construction, such as the newer hydroelectric installations under the Federal Power Commission, the Federal Water Power Act requires a consideration of original cost. This fact is brought out in recent decisions of that commission, as is evident in the following citations:

"The Federal Power Commission is required by the Federal Power Act to determine the actual and legitimate original cost of projects at the time of their acquisition by the licensee without regard to the price paid by the licensee corporation for controlling stock of merged corporations which originally acquired the property in question." *Re Alabama P. Co.* (Fed. P.C.), P.U.R. 1932D, 345. "The Federal Water

Power Act forbids the Commission to allow other than actual legitimate original cost, that is, real and bona fide, as distinguished from fictitious or fabricated, whether by intercorporate dealings or otherwise; and legitimate, meaning not coerced, collusive, fraudulent, or unreasonable; and original, as including elements of subsequent enhancement, profit, or accretion. Where there is common control it is not sufficient to show that the prices for services are no higher than obtainable elsewhere, but the burden is upon the licensee to show the actual cost to the service company. And, having, by intercorporate contract, destroyed the open market, licensee cannot appeal to the standard of the open market by which to measure the value of the services rendered in a closed market. Further, in determining the cost of services, the market value of such services does not measure their cost within the meaning of the Federal Water Power Act." *Re Louisville Hydroelectric Co.* (Fed. P.C. 1934), 1 P.U.R. (N.S.) 454.

A criticism of the use of original or historical cost as the basis of valuation in rate making comes from the fact that the Supreme Court, in *Smyth v. Ames*, calls for present value rather than cost. The original cost, taking into account the historical elements of growth and change, neglects the effect of changing prices and changing values during the life of a utility property. Appreciation in the value of property, due to increasing prices and changing unit prices for the elements of the property, must be taken into account in the determination of present value, as specified by the court. In like manner, any decrease in unit prices or land values due to changing economic conditions must also be reflected in the value chosen. Original cost often neglects the elements of overheads and intangible values attaching to the property. It also fails to consider the elements of obsolescence and inadequacy in the parts of the property that may be in service and that should be removed and replaced by newer and more efficient equipment for a well-constructed and efficiently operating whole. These and other elements will be emphasized in other sections of this chapter. However, original cost is recognized as one of the factors to be considered in the determination of the rate base. It is so recognized by the numerous courts and commissions. Two more recent cases will be considered as indicating the general trend of decisions.¹

¹ *Philadelphia v. Philadelphia Rapid Transit Co.* (Pa.), P.U.R. 1933E, 190; *Mobile Gas Co. v. Patterson*, 293 Fed. 208, P.U.R. 1924B, 644; *Indianapolis Water Co. v. McCart*, 13 F. Supp. 110 (1936), 12 P.U.R. (N.S.) 478;

A telephone company objected to an order of the Federal Communications Commission requiring it to use original cost as a basis for fixing value because estimates would have to be used when the actual costs were unknown. On appeal to the Supreme Court, the ruling was, in part, as follows:

"Estimates are at times inevitable in any system of accounts. Even under the system previously in vogue, the total purchase price, which was entered in an account known as 'telephone plant,' was subdivided into a series of accounts covering respectively pole lines, cable, aerial wire, and other classes, and distributed among them. If the price was a lump sum, there was need to resort to estimates in the process of subdivision. So, also, estimates were always necessary upon retirement of plant or equipment acquired at varying dates, unless the articles retired were so clearly identified that the dates of acquisition and the prices then paid for each of them were susceptible of ascertainment upon the face of the accounts themselves. All that can be said of the present regulations is that they make the occasion for estimates more frequent than in former years and the process more involved. The difference in degree is not proved to be so great as to drag nullity in its train. If instances shall occur in which a company is unable to make an intelligent estimate with even approximate correctness, that exceptional event will justify resort to the Commission for particular instructions. In no event is there a substantial hazard of criminal prosecution. To subject the company or its officers to prosecution for a crime the violation of the act must have been knowing and wilful." *American T. & T. Co. v. United States*, 299 U.S. 232, 57 Sup. Ct. 170 (1937),

Re Union E. L. Co. (Mo. 1937), 17 P.U.R. (N.S.) 337; Southwestern Bell Tel. Co. v. State, 181 Okla. 246, 71 P. (2d) 747 (1937), 19 P.U.R. (N.S.) 391; Re Northern States P. Co. (N.D. 1936), 15 P.U.R. (N.S.) 125; Public Util. Comm. v. Duquesne L. Co. (Pa. 1937), 20 P.U.R. (N.S.) 1; Clark's Ferry Bridge Co. v. Pennsylvania Public Service Comm., 291 U.S. 227, 54 Sup. Ct. 427, 78 L. ed. 767 (1934), 2 P.U.R. (N.S.) 225, affirming (Pa.) P.U.R. 1932C, 295, and 108 Pa. Super. 49, 165 Atl. 261, P.U.R. 1933D, 173; Wheeling v. Natural Gas Co. of West Virginia, 115 W. Va. 149, 175 S.E. 339 (1934), 5 P.U.R. (N.S.) 471; Southwestern Bell Tel. Co. v. San Antonio, 2 F. Supp. 611 (1935), 7 P.U.R. (N.S.) 433; Los Angeles Gas & E. Corp. v. California R. Comm., 287 U.S. 289, 77 L. ed. 1180, 53 Sup. Ct. 637, P.U.R. 1933C, 229; Rabbett v. Northern Conn. P. Co. (Conn.), P.U.R. 1933D, 119; Chesapeake & Potomac Tel. Co. v. West, 7 F. (2d) 214, (1934) 3 P.U.R. (N.S.) 241; Bronx Gas & E. Co. v. Maltbie, 268 N.Y. 278, 197 N.E. 281 (1935), 6 P.U.R. (N.S.) 337; California R. Comm. v. Pacific Gas & E. Co. 302 U.S. 388, 58 Sup. Ct. 334 (1938), 21 P.U.R. (N.S.) 480; Public Util. Comm. v. Solar E. Co. (Pa. 1938), 24 P.U.R. (N.S.) 337.

16 P.U.R. (N.S.) 225. "Failure of a Commission to determine value, the essential element in fixing rates, is a denial of due process when the entire decision of the Commission does not show that it has in fact determined fair value, but, on the other hand, the Commission has announced its intention to fix rates upon the historical cost." *California Water & Tel. Co. v. California R. Comm.*, 19F. Supp. 11 (1937), 18 P.U.R. (N.S.) 442.

Prudent Investment.—Many economists contend that the true measure of the value of the property as a rate base is the money actually invested in the property. The stockholders and bondholders have paid in this money and should have their investment protected so that other capital may be attracted to the enterprise as the property is expanded to meet the growth of the business. Modern economists have added the word "prudent" to this expression so as to bar out any money spent unwisely, such as the excess investment either in overbuilt enterprises that cannot be expected to earn a fair profit on the total investment or for write-ups in the value of the property by the addition of intangibles at the time of consolidation with other property.

This theory of valuation has developed to include the important consideration of prudent investment. Accompanying a consideration of prudent investment as a rate base has grown up an insistence on the adoption of a fixed value for the property, so that this will not need to be valued each time that a new set of rates is to be considered. The value thus fixed is to be added to only as the investment is increased by addition of capital structures, and not by appreciation of the property, so that a continuous value may be reported from year to year. The commissions in Massachusetts and California have been particularly favorable to this method of valuation. An early California case, decided prior to the case of *Smyth v. Ames*, is that of *Reagan v. Farmers Loan & Trust Co.*, part of which decision follows:

What is the test by which the reasonableness of rates is determined? This is not yet fully settled. Indeed, it is doubtful if any single rule can be laid down, applicable in all cases. Many things have happened to make the investment far in excess of the value of the property. Among these are injudicious contracts, poor engineering, unusually high cost of material, rascality on the part of those engaged in construction or management of the property, these and many other things. Nevertheless, the amount of money that has gone into the property—the

actual investment, as expressed theoretically, at least, by the amount of stocks and bonds—is not to be ignored, even though such sum is far in excess of the present value.—*Reagan v. Farmers Loan & Trust Co.*, 154 U.S. 412, 38 L. ed. 1014, 14 Sup. Ct. 1047, May 26, 1894.

It should be noted that this decision of the Supreme Court is earlier than that made in *Smyth v. Ames*, wherein other elements were mentioned for the consideration of the value for a railroad, and that investment was mentioned also in the latter case as one of the elements to be considered.

In an early California Commission case and one by the supreme court of that state, the following decisions were laid down:

It is fortunate, therefore, that the Supreme Court of the United States has failed to define value and has contented itself with pointing out certain elements that should be considered, leaving the determination of the composite fact value to the discretion of the tribunal empowered to act. My own view is that the nearest and fairest approximation which may be made to a correct value upon which a public utility shall be allowed to earn is the amount of the investment wisely made, and this view is not at all in conflict with the position of the courts in this regard.—*Re Water Rates and Service in the County of San Diego*, 2 Cal. R.C.R. 464.

But this is not an ordinary business enterprise. Those who engage in it put their property entirely into the hands of the public. Having once embarked, it is entirely beyond their power to draw back. They must always be ready to supply the public demand, and must take the risk of any falling off in that demand. They cannot convert their property to any other use, however unprofitable the public use may become. They have expended their money for the benefit of others, and subjected it to the control of others. That money has, in effect, been taken by the public. What the company has parted with—what the public has acquired—is the money reasonably and properly expended by the company in acquiring its property and constructing its works. The state has taken the use of that money, and it is for that use it must provide just compensation.—*San Diego Water Co. v. City of San Diego*, 118 Cal. 556, 50 Pac. 633, Oct. 9, 1897.

In 1907 the United States Supreme Court upheld the Federal district court in the Consolidated Gas Case, where the lower court used the following words:

The so-called “money value” of real and personal property is but a conveniently short method of expressing present potential usefulness,

and "investment" becomes meaningless if construed to mean what the thing invested in cost generations ago. Property, whether real or personal, is only valuable when useful. Its usefulness depends on the business purposes to which it is or may be applied. Such business is a living thing, and may flourish or wither, appreciate or depreciate; but, whatever happens, its present usefulness, expressed in financial terms, must be its value.—*Consolidated Gas Co. v. New York* (1907), 157 Fed. 849; affirmed on appeal in *Willcox v. Consolidated Gas Co.*, 212 U.S. 19, 53 L. ed. 382, 29 Sup. Ct. 192, 48 L.R.A. (N.S.) 1134.

The Massachusetts Commission controls the investment and the issue of securities of all public utilities operating within the state. This commission has consistently used prudent investment as a rate base in its valuation of utilities. This method had been agreed to by the different companies without appeal until the case of the Worcester Electric Light Company was appealed to the Federal courts in 1929. The decisions of the commission and the court are in part as follows:

"A rate base which takes as the controlling factor capital honestly and prudently invested is sound both in law and in economics." *Re Worcester E. L. Co. (Mass.)*, P.U.R. 1927C, 705. Reversed in the following decision: "The Federal courts must determine the question of confiscation of utility property by reference to the present value thereof, and in the absence of special controlling circumstances, reproduction value less depreciation is a fair measure of that value and may be considered as the dominant element thereof. The constitutional right of a utility to a fair return is not limited by, and need not be interpreted with reference to, a local practice established within a particular state by which the determination of a rate base is controlled by the so-called prudent investment theory." *Worcester E. L. Co. v. Attwill et al.*, 23 F. (2d) 891, P.U.R. 1929B, 1.

The use of prudent investment neglects any consideration of increasing prices for land and other elements entering into the construction of any particular utility from its inception to its present form. It also neglects items which may have been obtained without cost to the company but which are carried on the inventory, such as land from public domains, right of way, property constructed from surplus, and intangible items that go to make up the property as a whole. The theory also considers cost rather than value of the property. In other business enterprises, fluctuations in the unit prices of the elements are reflected

in the value of the property. These may be brought about by economic changes such as the sharp rise in prices during and after the World War, appreciation of land values due to the growth of the community in which the utility is situated, and other causes. If value is to be used rather than cost, prudent investment must be ruled out; if a fixed rate base is to be established, then prudent investment may be considered as one of the important elements, particularly where uniform systems of accounting have been established. In the case of the Bluefield Waterworks & Improvement Company, the West Virginia Commission held that investment was the very best basis of valuation and declared that other methods should be used only when it is impossible to arrive at the true investment. This case was reversed by the Supreme Court, which held that failure to accord proper, if any, weight to the greatly enhanced costs of construction at the date of a valuation over those prevailing before the War is erroneous in a proceeding to determine the reasonableness of rates.¹

Book Value.—All business enterprises carry an inventory value of their assets from year to year. Where these accounts have been carefully kept and are continuous from the starting of the enterprise down to the time of the determination of the value for rate making, these book accounts form a basis for checking other methods of valuation. However, such accounts are liable to be in error for several reasons. For enterprises that have grown from small beginnings or that have changed ownership several times, the books, although containing a continuous record, may at times include more than the property purchased, and, therefore, the record of the particular property may not be continuous,

¹ Bluefield v. Bluefield Waterworks & Improvement Co. (W. Va.), P.U.R. 1917E, 22; reversed in 262 U.S. 679, 67 L. ed. 1176, 43 Sup. Ct. 675, P.U.R. 1923D, 11; Re Central Union Tel. Co. (Ind.), P.U.R. 1920B, 813; Waukesha Gas & E. Co. v. Wisconsin R. Comm., 181 Wis. 281, 194 N.W. 846, P.U.R. 1923E, 634; Re Winnipeg E. R. Co. (Manitoba), P.U.R. 1920F, 879; Southern Bell Tel. Co. v. South Carolina R. Comm., 5 F. (2d) 77, P.U.R. 1926A, 6; Pacific T. & T. Co. v. Whitcomb, 12 F. (2d) 279, P.U.R. 1926D, 815; Public Service Gas Co. v. Public Service Comm'rs (1913), 84 N.J. L. Rev. 463, 87 Atl. 651; Joplin & Picher R. Co. v. Public Service Comm. of Mo., 267 Fed. 584; Steenerson v. Great Northern R. Co. (1897), 69 Minn. 353, 72 N.W. 713; Re Portland E. L. & P. Co. (Ore.), P.U.R. 1920D, 357, 364.

changes in price levels may not be taken care of, and prices of equipment that is removed from service and replaced by other equipment may not properly be accounted for in the statements. Gifts of property or easements and intangible and overhead items, not originally taken into account in the construction and operation, may not be entered on the books. Unless a carefully supervised system of accounting is installed, items of salaries, wages, and materials for construction, carried on by the regular operating force of the company, may not be allocated properly to the capital account, or they may be paid for out of operation and again charged to capital. These mistakes in accounting lead to doubts as to the property of any utility, unless the utility is recently constructed and carefully supervised from the start. The New York Commission makes note of these considerations in the Albion Case, cited below:

The book cost of electric utility property was used as the rate base when the books had been examined at various times by the Commission, the intangible items had been fixed and determined by the Commission and acquiesced in by the company, the company had from time to time acquired plants and developments already in operation and within recent years largely reconstructed its properties, a large part of the present development had been constructed during recent years when the cost of material and labor had reached its peak, and the books of the company were correctly kept and definitely fixed the actual cost of the property.—*Albion v. Western New York Util. Co.* (N.Y. 2d Dist.), P.U.R. 1922E, 119.

Other commissions and courts have considered the use of book value at numerous times. The book value has been accepted by some when checked by comparison of this value with values obtained by other methods in similar utilities;¹ by others it has been criticized as not including an element of appreciation,² or on the ground that it is not decisive,³ or when built up from accounts of subsidiary companies,⁴ or from purchase and sale of

¹ Re Tri-State T. & T. Co. (Minn.), P.U.R. 1925D, 458; Re Twin City Tel. Co. (Wis.), P.U.R. 1924E, 379.

² *Indiana Bell Tel. Co. v. Public Service Comm. et al.*, 200 Fed. 190, P.U.R. 1925A, 363.

³ *Brooklyn Borough Gas Co. v. Prendergast*, 7 F. (2d) 628, P.U.R. 1926A, 412.

⁴ *Texas R. Comm. v. Atchison, T. & S. F. R. Co.*, 20 I.C.C. 463.

smaller companies,¹ and was accepted as better than reproduction cost.²

Book value is also discussed in two decisions, one by a state court and the other by the Supreme Court, in the following cases:

"It is a fair assumption that a corporation will ordinarily record the correct value of its property on its own books; that the books should, therefore, be considered as offering more dependable evidence of value than the higher estimates of appraisers or witnesses, unless some plausible reason is advanced why the book value is too low; and in view of the fact that the appraisers were not called as witnesses, and the personnel of the appraisers was not disclosed, and the manner in which the appraisal was conducted did not appear, and that no witness testified that the appraisal value was correct, or explained why the book value was incorrect." *Bluefield Tel. Co. v. Pub. Service Comm.* (W. Va.) P.U.R. 1927B, 855. "The United States Supreme Court, Mr. Justice Stone delivering the opinion, said that book value, which was somewhat in excess of actual cost of natural gas lands, might be accepted not as evidence of the real value of the gas field, but as an assumed value named by the company, which, on the evidence presented, could not reasonably be fixed at any higher figure." *United Fuel Gas Co. v. R. Comm. of Ky.*, 278 U.S. 300, 73 L. ed. 420, 49 Sup. Ct. 157, P.U.R. 1929A, 433.

The attitude of the Interstate Commerce Commission toward the use of book value is shown in the following citation:

This is no place to enter upon an extended criticism of the practice of American railways in the matter of their property accounts, nor is such a criticism necessary for the purpose in hand. It is sufficient to refer to the well known fact that no court, or Commission, or accountant, or financial writer would for a moment consider that the present balance-sheet statement purporting to give "cost of property" suggests, even in a remote degree, a reliable measure of money invested or present value.—Annual Report, Interstate Commerce Commission (1909), p. 85; cited in *Re Southern Pacific Co. (Nev.)*, P.U.R. 1920F, 725.

Market Value.—Market or sales value, already mentioned, is sometimes used in the determination of the rate base. Many business enterprises exchange hands so that there is established a certain market value for these pieces of property. However,

¹ *Re Coos & Curry Tel. Co. (Ore.)*, P.U.R. 1924E, 344.

² *Re Chesapeake & Potomac Tel. Co. of Baltimore v. West*, 7 F. Supp. 214 (1934), 3 P.U.R. (N.S.) 241.

when a public utility is sold, the exchange is consummated at a private sale where the actual consideration is not known. If announced, the price may be fixed on an arbitrary basis, the real consideration being an exchange of securities between the old company and the newer organization, which may be a holding company, where no "arm's-length" agreement may have been made for the sale. Market value is also influenced by the rates; since it is the rates that are to be determined, any value depending upon the rate would defeat the purpose of the valuation. For this reason, market value is seldom considered as a measure in the modern determination of the rate base.¹

The California Commission discusses the problem of the use of sale value in a case where water rates for the county of San Diego were under consideration in 1913, as follows:

And were it not for the fact that such an eminent authority as the Supreme Court of the United States rejects the view that what a utility property as a whole will sell for determines its value, mainly on the ground that because of the nature and magnitude of such properties they do not exchange hands often enough to use this method as a guide, I should think the mere statement of this theory would carry with it its refutation. Of course, in a rate fixing inquiry, what a property as a public utility will sell for has no place as a factor, except as such amount is affected by its earning capacity.—*Re Water Rates and Service in the County of San Diego*, 2 Cal. R.C.R. 464, Mar. 28, 1913.

Capitalization Value.—The market value of the outstanding stocks and bonds has been suggested as the proper measure of the rate base of a utility. In some cases the face value of these securities has been used, but, with the issuance of large blocks of "no-value" stock, this method has become impossible. Some authorities have held that the market value of securities is the best measure of the value of the property. It must be remembered, however, that the market value of the securities of a company is measured quite as much by the earning capacity of the company as by any element of real intrinsic value of the property itself and that earning power is intimately associated with the rates as well as with the rate base. Use of any element depending upon earning power is based on circuitous reasoning, for increase in the base increases the earnings, and increase in the

¹ *Maires v. Flatbush Gas Co.* (N.Y. 1st Dist.), P.U.R. 1920E, 930; *Re Alexandria Water Co.* (Va.), P.U.R. 1932C, 342.

earnings again produces increase in the base, and that again the earnings. A public utility is a monopoly and cannot be judged on the basis of competitive enterprises.

In the case of *Smyth v. Ames* it was argued that the securities were no longer in the hands of the original owners but had been sold to the public, including widows, orphans, and insurance companies. This phase of the question had already been decided in *Covington & Lexington Turnpike v. Sandford*. These two cases are cited again as they bear on the phase of capitalization.

"It cannot be said that a corporation is entitled as a right, and without reference to the interests of the public to realize a given per cent on its capital stock. When the question arises whether the legislature has exceeded its constitutional power in prescribing rates to be charged by a corporation controlling a public highway, stockholders are not the only persons whose rights are to be considered. The rights of the public are not to be ignored. If a corporation cannot maintain such a highway and earn dividends for stockholders, it is a misfortune for it and them which the Constitution does not require to be remedied by imposing unjust burdens upon the public." *Covington & Lexington Turnpike v. Sandford*, 164 U.S. 578, 41 L. ed. 560, 17 Sup. Ct. 198 (1897).

"In our opinion the broad proposition advanced by counsel involves some misconception of the relations between the public and a railroad corporation. It is unsound in that it practically excludes from consideration the fair value of the property used, omits altogether any consideration of the right of the public to be exempt from unreasonable exactions, and makes the interests of the corporation maintaining a public highway the sole test in determining whether the rates established by or for it are such as may be rightfully prescribed as between it and the public. If a railroad corporation has bonded its property for an amount that exceeds its fair value, or if its capitalization is largely fictitious, it may not impose on the public the burdens of such increased rate as may be required for the purpose of realizing profits upon such excessive valuation or fictitious capitalization; and the apparent value of the property and franchises used by the corporation as represented by its stocks, bonds, and obligations is not alone to be considered when determining the rates that may be reasonably charged." *Smyth v. Ames* (1898), 169 U.S. 466, 42 L. ed. 819, 18 Sup. Ct. 418.

In spite of rulings by commissions and courts to the contrary, it is the belief of many persons, supported by speeches of politicians and prominent men not well informed on the subject, that capitalization forms the basis on which rates of a public utility

are calculated. For this reason, much discussion appears in the press relative to "watered stocks" and "write-ups" in values to establish a base for capitalization. It is true that a public utility must earn a sufficient amount from its rates so that it may attract additional capital freely into the enterprise as the community grows and the capital structure is extended to meet these additional needs. The attraction must, however, depend upon a liberal rate base coupled with proper rates to attract new business as well as to provide a fair return. The increase in earnings may also be accomplished by superior management, and this phase is important in consideration of the rate of return to be allowed.¹ The attitude of the courts is again clear in the following citations:

"Capitalization is neither a measure of nor a guide to the value of the property." *Knoxville v. Knoxville Water Co.*, 212 U.S. 1, 29 Sup. Ct. 149, Jan. 4, 1909. "The par value of stock which has been issued by a corporation in the process of merging several corporations with its own entity, in exchange for stock of the merged corporations and for the acquisition of its own former assets, need not be accepted as a criterion of the actual value of such assets at that time, especially where the contracting parties were already under a common corporate control." *Re Alabama P. Co.* (Fed. P.C.), P.U.R. 1932D, 345. "The aggregate amount of the common stock plus the funded debt is not fair measure of the fair value of electric utility property." *Re Detroit Edison Co.* (*Mich.* 1936), 16 P.U.R. (N.S.) 9.

Reproduction Cost.—The decisions of the higher courts call for present value of the property of the utility as one of the criteria upon which a rate base is to be fixed. In order to arrive at present value, the commissions and courts have taken into consideration the fluctuation in prices of materials and labor from the time of construction of each particular unit to the time fixed for the appraisal of the property. This value has included appreciation in land values, if any exists owing to any cause whatsoever, changes in unit prices along trend curves for materials and labor going into the construction, accretions by any means such as gifts, and other elements of the property. One

¹ *Ohio & Colo. Smelting & Refining Co. v. Public Util. Comm.*, 68 Colo. 137, 187 Pac. 1082, P.U.R. 1920D, 197; *Louisville & Nashville R. Co. v. Alabama R. Comm.*, 196 Fed. 800, Apr. 5, 1912; *Fuhrmann v. Buffalo G. E. Co.* (1913), 3 P.S.C. N.Y. (2d Dist.) 739; *Re New York State R. Co.* (N.Y.), P.U.R. 1919A, 755.

method of arriving at this result is to make a careful inventory of every element of the property used and useful at the time of the inquiry, and to apply to this inventory unit prices as of the time of the inquiry, taking into account the trend of these prices. This method of valuation is known as the "reproduction-cost method." The value reached by this method may or may not be reduced owing to depreciation of the property, an additional phase of the question which will be discussed in a later chapter.

Since the trend in unit prices has been upward on a gradual curve during most of the period since regulation of public utilities has been under consideration by commissions and courts, it has been to the advantage of the utilities to have reproduction cost adopted in as many cases as possible. In the case of the railroads, this increasing trend in prices has brought about a closer equality between the actual present value and the outstanding capitalization, particularly where the stock of the company was at one time heavily watered. In no case has the Supreme Court said that reproduction cost must be given exclusive weight in the valuation. However, it has held that it must be one of the elements considered, and in many cases it has been given considerable weight, particularly in the Federal court decisions.¹

"Circuit Judge Ross said that weight is given to the cost of reproduction because there is usually no other way of arriving even approximately at the fair market value of the utility's property, and that Commissions and courts were forced to give great weight to what the

¹ *Kennebec Water Dist. v. City of Waterville*, 97 Me. 185, 54 Atl. 6, Dec. 27, 1902; *Milwaukee v. Milwaukee E. R. & L. Co.* (1912), 10 Wis. R.C.R. 1; *State Pub. Util. Comm. ex rel. Springfield v. Springfield Gas & E. Co.* 291 Ill. 209, 125 N.E. 891, P.U.R. 1920C, 640; *Waukesha Gas & E. Co. v. Wisconsin R. Comm.*, 181 Wis. 281, 194 N.W. 846, P.U.R. 1923E, 634; *Okmulgee Gas & E. Co. v. Corp. Comm.*, 95 Okla. 213, 220 Pac. 28, P.U.R. 1924B, 249; *Re Moncton Tramways, Electricity & Gas Co., Ltd.* (New Brunswick), P.U.R. 1932B, 368; *Louisville & N. R. Co. v. R. Comm. of Alabama*, 196 Fed. 800, Apr. 5, 1912; *Kings County L. Co. v. Prendergast*, 7 F. (2d), 192 P.U.R. 1925C, 705; *United Fuel Gas Co. v. Public Service Comm.*, 114 F. (2d) 209, P.U.R. 1927A, 708; *Idaho P. Co. v. Thompson*, 19 F. (2d) 547, P.U.R. 1927D, 388; *New York Tel. Co. v. Prendergast*, 36 F. (2d) 54, P.U.R. 1930B, 33; *Columbus Gas & Fuel Co. v. Columbus*, 17 F. (2d) 630, P.U.R. 1927C, 639; *Elko-Lamoille P. Co.*, 1 F. Supp. 790, P.U.R. 1933B, 191; *Missouri ex rel. Southwestern Bell Tel. Co. v. Missouri Pub. Service Comm.*, 262 U.S. 276, 67 L. Ed. 981, 43 Sup. Ct. 544, P.U.R. 1923C, 193; *Bluefield Waterworks & Improvement Co. v. West Virginia*

evidence showed the cost of reproduction would be. In so doing it is only fair to bear in mind how seldom a purchaser of a public utility no matter how free a market for it might be, would feel justified in paying for it as much as it would cost to reproduce all of its property, even after making proper allowance for any physical depreciation it has undergone." *United Fuel Gas Co. v. Public Service Comm.*, 14 F. (2d) 209, P.U.R. 1927A, 707. "The Commission cannot decide that reproduction cost ought not to be considered in determining the rate base because if the property were not already in existence it would not be reproduced. The question whether the property would be reproduced was not before the Commission for decision, and it was not one of the functions of the Commission to determine whether or not the property would or would not be reproduced." *Yonkers R. Co. v. Public Service Comm.*, 266 App. Div. 542 (N.Y. 1935), 6 P.U.R. (N.S.) 1.

There are many difficulties in the application of the reproduction-cost theory in the determination of present value. Some of the questions that have arisen in this connection are as follows: Should the cost of reproduction mean the cost of the substantially identical reproduction of the existing plant or the cost of the most modern approved design capable of performing the same service? Should it mean the cost at present prices of land, labor, and materials of reproducing the existing plant under present or hypothetical conditions or the cost at present prices of land, labor, and materials of reproducing the existing plant under the actual conditions under which the existing plant was constructed?¹ These difficulties were discussed and other difficulties were listed in a case before the New York Commission, Second District, as follows:

An objection to this (reproduction cost) theory is the practical impossibility in many cases of ascertaining with any reasonable degree of

Pub. Service Comm., 262 U.S. 679, 67 L. ed. 1176, 43 Sup. Ct. 675, P.U.R. 1923D, 11; *Georgia R. & P. Co. v. Georgia R. Comm.*, 262 U.S. 625, 67 L. ed. 1144, 42 Sup. Ct. 351, P.U.R. 1923D, 1; *Los Angeles Gas & E. Corp. v. California R. Comm.*, 289 U.S. 287, 77 L. ed. 1180, 53 Sup. Ct. 637, P.U.R. 1933C, 229; *Dayton P. & L. Co. v. Ohio Pub. Service Comm.* 292 U.S. 290, 78 L. ed. 1261, 54 Sup. Ct. 647 (1934), 3 P.U.R. (N.S.) 279.

¹ *Bachrach v. Consolidated Gas Co. of Baltimore*, 14 A.T. & T. Co. Com. L. 154, Jan. 13, 1913; *Hall v. Lehighton Water Co. (Pa.)*, P.U.R. 1924E, 266; *Re Michigan Tel. Co. (Mich.)*, P.U.R. 1923A, 30; *New York Interurban Water Co. v. Mt. Vernon*, 110 Misc. 281, 180 N.Y. Supp. 304, P.U.R. 1920D, 515; *Re Central Oregon Tel. Co. (Ore. 1937)*, 17 P.U.R. (N.S.) 164; *Presque Isle Water Co. v. Itself (Me. 1937)*, 18 P.U.R. (N.S.) 385.

accuracy the cost of reproduction new. The cost of reproduction new depends upon a large number of uncertain and variable factors. It depends upon the efficiency of labor, the cost of materials, the wisdom and judgment of superintendents, weather conditions obtaining during the process of construction, unforeseen delays from accidents which cannot be known or foreseen in a large number of cases. One special condition which it is impossible to determine in this case is the character of the soil in which the pipes must be laid. A further criticism of the cost of reproduction new is that it is more obviously just to the consumer to charge him the cost of reproducing the service than the cost of reproducing the existing instrument of service.—*Buffalo Gas Co. v. City of Buffalo*, 3 P.S.C. N.Y. (2d Dist.) 553.

Abnormal price levels, such as those immediately following the World War, brought on many controversies as to the proper unit prices to be employed for appraisals made during that period. The adoption of unit prices of the period of the appraisal, without any consideration of prewar prices or of the probable trend of prices after the peak period was over, would give an undue advantage to the utility for property constructed at prices paid before the War. However, construction made at the high price level should be allowed prices commensurate with the cost. The low price levels during the recent economic depression induced the public to bring many cases before the commissions with the object of having the valuations lowered in the face of lower prices for commodities. Neither of these price levels held for a long period. It is, of course, objectionable to have the rate base fluctuate with every appraisal and with every slight price change. The reproduction-cost theory never contemplates large and rapid shifts in the rate base due to such causes. However, this rapid shifting has been urged as one of the objections to the use of this method of determination of the rate base. The greatest unanswered objection is apparently the length of time required and the expense attending the determination of the rate base each time new rates are to be derived. This has tended to make the regulation by state commissions slow and, in some cases, inoperative. Whenever these cases are carried to the courts, further delay is experienced, and in some cases the rates then determined are improper in the light of new conditions at the time of the final decision.

In many of the decisions, the courts have ruled that reproduction cost need not be specifically determined and used but that it

shall be considered as one of the elements in the final determination of the rate base. This ruling was held in the Georgia Railway & Power Company Case as well as in others before the Supreme Court, in the following words:

"A refusal to value the properties of a utility at the replacement cost, in a rate proceeding, is proper when careful consideration has been given to this factor together with other measures of value." *Georgia R. & P. Co. v. Georgia R. Comm.*, 262 U.S. 625, 67 L. ed. 1144, 43 Sup. Ct. 680, P.U.R. 1923D, 1. Similar consideration was given in *Galveston E. Co. v. Galveston*, 258 U.S. 388, 66 L. ed. 678, 42 Sup. Ct. 351, P.U.R. 1922D, 159; *Missouri ex rel. Southwestern Bell Tel. Co. v. Missouri Pub. Service Comm.*, 262 U.S. 276, 67 L. ed. 981, 43 Sup. Ct. 544, P.U.R. 1923C, 193; *Bluefield Waterworks & Improvement Co. v. West Virginia Pub. Service Comm.*, 262 U.S. 679, 67 L. ed. 1176, 43 Sup. Ct. 675, P.U.R. 1923D, 11.

In the consideration of the valuation of the St. Louis & O'Fallon R. Co. by the Interstate Commerce Commission, in connection with the determination of the amount of earnings to be recaptured by the government, this commission failed to consider reproduction cost as an element in the valuation. On appeal, the Supreme Court reversed the commission and ruled that this must be considered as one of the elements, *St. Louis & O'Fallon R. Co. v. I.C.C.*, 279 U.S. 461, 73 L. ed. 798, 49 Sup. Ct. 384, May 20, 1929; appealed from 22 F. (2d) 980, P.U.R. 1928A, 740.

Tax or Assessment Value.—Public utilities, as well as other business enterprises, are required to render to the state and local taxing units statements of the value of their property for taxation. These valuations are for the purpose of fixing the particular tax, and the items and deductions are covered by the local laws in each jurisdiction. In some states there are boards of taxation or boards of equalization the duty of which is to fix uniform assessments for tangible property throughout the state, including the property of utilities. It has been contended that these declared valuations or assessments, as fixed by one tribunal, should be the same for all purposes and should be used for the determination of the rate base of public utilities. This opinion was held by the courts in the following cases:

"The court held that there could be only one true value independent of the purpose." *State ex rel. Bee Building Co. v. Savage*, 65 Neb. 714, 91 N.W. 716, Sept. 8, 1902. "There cannot be one true value for a return for taxation and a different true value for rate making purposes;

the value must be and is one and the same." *Great Falls Gas Co. v. Public Service Comm. of Montana*, 34 F. (2d) 297, P.U.R. 1929E, 628.

In the majority of cases before commissions and courts, taxation value has been rejected from consideration in the determination of the rate base. It is recognized that there are many items which have a value for operation and which do not have to be declared for taxation. In some states, the intangible items are included in this group. There are other items that must be rendered for taxation because owned by the utility but that are not valued for the rate base, for they are not used and useful in carrying on the business of the utility in rendering service. Such items may consist of coal mines operated by the utility, buildings owned but not used, pavement between the rails of street railways put in by order of the city or state and maintained by the utility, and many others. The assessor is not a valuation expert of property similar to that of a utility, and his methods are not recognized by the courts or commissions as proper for the valuation of such property for a rate base. When the case is under consideration, he is seldom called in as a witness to defend his valuation, and the utility has no chance of cross-examination to determine the accuracy of his results, his unit costs, or his appraisal of the property. For these reasons, assessed values are seldom used in the determination of the rate base except for the purpose of checking against other methods, and then they are given little weight. In a few cases, the assessed value has been used by agreement between the commission and the utility.¹

Sale Price.—Where a public utility has been sold at a recent date, the price paid for the property has been advanced as the true investment made by the present owners and as the proper amount to be fixed as the rate base. Where the sale is between

¹ Re West Virginia Cent. Gas Co. (W. Va.), P.U.R. 1918C, 453; Re Chicago R. Co. (Ill.), P.U.R. 1921A, 466; Brooklyn Union Gas Co. v. Fren-dergast, 7 F. (2d) 628, P.U.R. 1926A, 412; Missouri Rate Cases, 230 U.S. 474, 33 Sup. Ct. 975, June 16, 1913; Re Butte Water Co. (Mont. 1935), 10 P.U.R. (N.S.) 26; Lima v. Public Util. Comm., 106 Ohio St. 379, 140 N.E. 147, P.U.R. 1923E, 577; Vincennes Water Supply Co. v. Indiana Pub. Service Comm., 34 Fed. (2d) 5, P.U.R. 1929E, 339; Minneapolis Gas L. Co. v. Minneapolis, P.U.R. 1930D, 517; Re Union E. L. Co. (Mont.), P.U.R. 1933D, 377; Re United Traction Co. (N.Y.), P.U.R. 1927D, 637; Re Fort Worth Gas Co. (Tex. 1928), P.U.R. 1929A, 136; Southern Bell T. & T. Co. v. Public Service Comm. (La. 1937), 18 P.U.R. (N.S.) 1.

"strangers in interest" capable of making an "arm's-length" agreement, this price is indicative of the market value of the property. However, market value is fixed more by the earnings of the property under present or proposed rates than by the rate base of the property which is to be determined independent of the earnings.¹ As stated by the Michigan Commission: "Value is what a man or corporation desiring to buy a utility would be willing to pay and what an owner not anxious but willing to sell as a matter of business would be willing to take for it." *Re City of Lapeer (Mich)*, P.U.R. 1923B, 738.

Where the sale has been made at a foreclosure² or the value is the amount agreed upon between an operating utility and a holding company, the value set up is under question and is seldom of any use in the determination of the rate base.³

Capitalization of Earnings.—In a few cases the capitalization of earnings of the utility has been advanced as a measure of the value for rate making. Since the earning capacity of an ordinary competitive business enterprise is the controlling factor in the determination of its value for purchase or exchange between parties to the sale, it has been urged that this is also a fair measure in the case of a utility. However, a public utility enjoys a monopoly in its field, untouched by competition such as exists among free business enterprises. This condition of monopoly removes the utility from the elements that aid in a determination of value in competitive channels. Earnings depend upon rates and the volume of the business and not upon the actual rate base and the rate of return. The value fixed by rates and earnings defeats the purpose of the valuation.⁴ This principle is expressed by the Supreme Court as follows: "The value of use, as determined by return, cannot be made the criterion when return itself is in question." *Minnesota Rate Cases (Simpson v. Shepard)*, 230 U.S. 352, 57 L. ed. 1511, 33 Sup. Ct. 729.

¹ *Re Capital Traction Co. (D.C.)*, P.U.R. 1919F, 779; *Milne v. Montpelier & Barre L. & P. Co. (Vt.)*, P.U.R. 1920E, 558; *Re Michigan State Tel. Co. (Mich.)* P.U.R. 1923A, 30.

² *Steenerson v. Great Northern R. Co. (1897)*, 69 Minn. 353, 72 N.W. 713; *Eshelman v. Title Guarantee & Trust Co. (Cal.)*, P.U.R. 1916D, 488.

³ *Re Alabama P. Co. (Fed. P.C.)*, P.U.R. 1932D, 345; *Damarascotta-Newcastle Water Co. v. Itself (Me.)* 186 Atl. 799 (1936), 15 P.U.R. (N.S.) 498.

⁴ *Re Westchester S. R. Co. (1912)*, 3 P.S.C. N.Y. (2d Dist.) 286; *Re Baltimore County Water & E. Co. (Md.)*, P.U.R. 1918F, 522.

CHAPTER III

ASCERTAINMENT OF THE RATE BASE

General Considerations.—In the determination of the rate base of a public utility by any of the methods outlined in Chap. II, it is necessary to make an audit of the books of the company and usually an inventory of its physical property. Where the utility is only one unit of a combined utility or part of a system operated by a larger holding company, this process often involves a careful accounting to allocate the cost to each branch of the whole system. This allocation is necessary in order to determine the rate base for the particular branch of the system for which the rates are to be determined. A determination must then be made of the items that are truly used and useful in the operation of the utility, to eliminate any elements that must be retired. The condition of the plant must be determined by inspection and by the use of other methods described under depreciation. To the final listed inventory of equipment, unit prices must be applied if a determination of reproduction cost is to be made. These unit prices must be carefully selected, either from the books of the company or from prices paid for similar units in the immediate vicinity, and allowance must be made for price trends. This chapter discusses the proper unit prices and some other questions that pertain to the use of the inventory.¹

Present-day Unit Prices.—The decisions of the courts and commissions call for the present value of the property. For this purpose, present-day unit prices should be used in the determina-

¹ Re Mountain States T. & T. Co. (Colo.), P.U.R. 1917B, 198; Re Southern California Tel. Co. (Cal.), P.U.R. 1925C, 527; Re Chambersburg Gas Co., 116 Pa. Super. 196, 176 Atl. 794 (1935), 7 P.U.R. (N.S.) 359; Re Boise Water Co. (Idaho), P.U.R. 1926D, 321; Re Chesapeake & Potomac Tel. Co. (Va.), P.U.R. 1926E, 482; Hill v. Antigo Water Co. (1909), 3 Wis. R.C.R. 623; Vanderwood L. & P. Co. (Idaho), P.U.R. 1926E, 222; Re Bluefield Waterworks & Improvement Co. (W. Va.), P.U.R. 1927B, 276; Re Lakewood Water Co. (N.J.), P.U.R. 1928A, 705; New York Tel. Co. v. Prendergast, 36 F. (2d) 54, P.U.R. 1930B, 34.

tion. This does not mean "spot" prices of the materials as of the exact date of the appraisal,¹ but it has been interpreted to mean an average of prices taken over a considerable period. Formerly, the courts would not permit projection of these prices into the future, when the rates would be in effect, holding that such determinations were too speculative. In consequence, there grew up the custom of taking average prices over a period of 5 or 10 years preceding the date of the inquiry.² This practice was approved by the courts, for the trend curves of unit prices had nearly uniform slopes with few peaks to invalidate their averages. However, with the advent of the World War and the peak of prices immediately following, there was a protest concerning the advisability of using such averages,³ and an appeal was made to use the prewar prices on all early construction and the then present prices on new construction. Again, with falling prices during the economic depression, the unit price curves were given sudden dips, making the peaks depart too much from the average for its determination to be exact enough to remove the complaints, particularly on the part of the utilities.⁴ The subject of present-day unit prices has been discussed at length by the commissions and courts.

Average Unit Prices.—In order to meet the objections of commissions and courts to prices as of the date of the inquiry, many commissions used, as stated in the last section, average unit prices for 5- or 10-year periods preceding the inquiry. The former Wisconsin Railroad Commission used a 10-year average in many of its cases. This period was also adopted in cases decided in Arkansas, Indiana, Minnesota, and Vermont. A

¹ Public Util. Comm. v. Elizabethtown Water Co., 43 F. (2d), 478 P.U.R. 1930E, 373; Re Southern Bell Tel. Co. (N.C. 1935), 7 P.U.R. (N.S.) 22; Municipal Gas Co. v. Wichita Falls (Tex. 1935), 9 P.U.R. (N.S.) 33.

² New York & Richmond Gas Co. v. Prendergast, 10 F. (2d) 167, P.U.R. 1926D, 729; Elko-Lamoille P. Co. v. Public Service Comm. of Nevada, 1 F. Supp. 790, P.U.R. 1933B, 191; Alton Water Co. v. Illinois Com. Comm., 279 Fed. 869, P.U.R. 1922E, 623.

³ State ex rel. Southwestern Bell Tel. Co. v. Missouri Public Service Comm., 262 U.S. 276, 67 L. ed. 981, 43 Sup. Ct. 544, P.U.R. 1923C, 193; Rhode Island Pub. Util. Comm. v. New England Tel. Co., P.U.R. 1926C, 208.

⁴ McCardle v. Indianapolis Water Co., 272 U.S. 400, 47 Sup. Ct. 144, P.U.R. 1927A, 15; Re Logansport Home Tel. Co. (Ind.), P.U.R., 1928E, 715.

5-year average was used also in Wisconsin and in Maine, New Hampshire, and some other states. In an article published in *Proceedings of the American Society of Civil Engineers*, Nov., 1910, p. 1506, Henry Earl Riggs states:

As a basis, the average for either 5 or 10 years should be used in preference to current prices on all such materials and equipment as are fairly stable. Rail, and all forms of rail structures, machinery, locomotives, cars, etc., can be reduced to such a unit that unit prices can be secured which will eliminate the error due to a period of extremely low prices. In the case of such materials as lumber and ties, the price of which has been steadily rising, due to the growing scarcity of the material, a price based upon a long average is unfair to the corporation, and it would appear to be proper to use current prices. There can be no hard-and-fast rule which will be applicable to all appraisals. The unit prices must be such reasonable figures as can be sustained in court.

It is a well-known fact that during depression years of low prices it is usually difficult for utilities to finance additions and improvements to their systems and that during periods of higher prices it is easier to finance such additions. For this reason, a weighted average should be used in order to be fair to the utility. This average should be weighted both for kinds and for quantities of commodities, and also for years of construction, rather than for years of low prices. Price indexes also are difficult of application for similar reasons as well as for the inability to select the articles to be averaged in the index. This will be explained later under the heading of price indexes.¹

In the Buffalo Gas Case, the commission presents arguments against the use of average prices for any definite period, as follows:

The use of an average is theoretically open to serious objections. It does not give the price at any given time of the valuation; it does not, unless by accident, give the price at any particular period. An average does not necessarily represent the cost at any one time, and therefore, the use of an average is merely an effort to approximate what is supposed to be justice, instead of adhering to any logical and consistent rule. If we adopt the cost to the company as a unit price, that is consistent

¹ Re Pocatello Gas & P. Co. (Idaho), P.U.R. 1923C, 25; Winona v. Wisconsin-Minnesota L. & P. Co., 276 Fed. 996, P.U.R. 1922C, 461; *Holland v. McGuire* (Mich.), P.U.R. 1920B, 149; Re Union E. L. & P. Co. (Mo.), 1937, 17 P.U.R. (N.S.) 337.

and intelligible. If we adopt the price at the time of the valuation, that is also consistent and intelligible. Either may or may not work out justice. The moment we take an average over a series of years, we admit that neither the cost nor the price at the time of the valuation does justice to both parties; and therefore, by the use of an average we have a direct recognition of the principle that in fixing values for the purpose of rate making, justice and equity between the parties should be considered rather than any hard and fast rule. When we adopt an average, however, we immediately get into difficulties. Should the average cover the period during which pipe is laid, and this upon the theory of endeavoring to approximate the actual cost to the company, upon the assumption that the actual cost cannot otherwise be ascertained? If we take the period near the time of valuation, if the reproduction cost is the value, why should we take the value five years before the valuation as an element to be considered? What end of justice is to be subserved by that?—*Buffalo Gas Co. v. Buffalo* (1913), 3 P.S.C. N.Y. (2d Dist.) 553.

Abnormal Prices.—The period during and following the World War was one of abnormal prices and rapidly shifting price levels. Averages of prices obtained by the older methods of securing averages were meaningless under such rapid fluctuations.¹ The commissions and courts were powerless to make any reliable predictions about future price trends under such wide fluctuations, and valuations made during this period were not consistent as to the application of methods of arriving at the basis of unit prices.² One group of valuation engineers advocated the use of average prices obtained for a considerable period before the War and the shorter after-war period.³ Others favored valuing the new construction at new prices and the old construction at pre-war prices to equalize the great difference.⁴ A few advocated using the new price levels for the valuation, although this method would give a new rate base much higher than that formerly used for the same utility.⁵ The same discussion has arisen for the

¹ *Kings County L. Co. v. Lewis*, 110 Misc. 204, 180 N.Y. Supp. 570, P.U.R. 1920D, 145.

² *Galveston E. Co. v. Galveston*, 272 Fed. 147, P.U.R. 1921D, 547; affirmed in 258 U.S. 388, 66 L. ed. 678, 42 Sup. Ct. 351, P.U.R. 1922D, 159.

³ *Westminster v. Consolidated Pub. Util. Co. (Md.)*, P.U.R. 1919E, 506; *Re Atlantic City Sewerage Co. (N.J.)*, P.U.R. 1923A, 734.

⁴ *Winona v. Wisconsin-Minnesota L. & P. Co.*, 176 Fed. 996, P.U.R. 1922C, 461.

⁵ *Mobile Gas Co. v. Patterson*, 294 Fed. 208, P.U.R. 1924B, 644.

prices prevailing during the depression following the high price levels. During the high-price period it was to the advantage of the utilities to seek a new rate base; but, during the recession of prices, many cases have been brought by the public, asking for lower rate bases and subsequent lower rates.

Price Indexes and Price Trends.—The rapid fluctuations of unit prices for all commodities and labor-unit prices following the World War led to the consideration of the use of price indexes and price-trend curves for projecting the valuation into the future rather than into the past. Such suggestions made previous to that time had been frowned upon by the courts as too speculative. However, with these rapid fluctuations in prices, an average price became still more speculative. Since the rates that are to be determined are to remain fixed for a period of years in the future, the value fixed as a rate base should, therefore, be for the same period as that fixed for the rates rather than for a previous period.¹

In using index numbers and price curves, the question naturally arises which index to use. There are many commodity indexes published by economic bureaus, but most of these are for mixed commodities and are weighted according to arbitrary scales. Again, these indexes are for prices prevailing at certain centers of the country which may have quite different unit costs from those of the locality in which the utility is situated. These differences are due to natural causes such as distance from established price centers and freight and handling charges. What is desired for the particular appraisal in hand is a price index of commodities covering those used in the construction of the particular utility, delivered and unloaded at the point of use, and with the index weighted according to the quantities of the articles used in the particular construction in hand. Such an index can sometimes be prepared from the unit prices on the books of the company rather than from other sources. This method was approved in the *United Railways of St. Louis Case* cited above. Other cases from commissions and courts covering this phase will be cited below, including reference to labor indexes. The use of such index numbers is made by their application to valuations

¹ *East Chicago v. East Chicago & Indiana Harbor Water Co. (Ind.)*, P.U.R. 1922A, 193; *Re United R. Co. of St. Louis (Mo.)*, P.U.R. 1928F, 420; *Re Laclede Gas L. Co. (Mo.)*, P.U.R. 1929C, 561; *Re Billings Gas Co. (Mont.)*, P.U.R. 1933D, 337.

determined at some period in the past not too far removed from the present valuation. The actual application will be discussed in the next section.¹

The court refused to accept as evidence of the present fair value of telephone properties for rate making an appraisal by the commission based upon a finding of present value made by the court in a rate case involving the same properties several years previous—such basis figure being adjusted to reflect current price levels and trends by the use of certain weighted index numbers of commodity prices—where such prices were based upon a different and more fluctuating character of property than that actually inherent in the utility plant under inquiry.—*Chesapeake & Potomac Tel. Co. of Baltimore v. West*, 7 F. Supp. 214, (1934), 3 P.U.R. (N.S.) 241; affirmed by 295 U.S. 662, 79 L. ed. 1640, 55 Sup. Ct. 894 (1935), 8 P.U.R. (N.S.) 433.

Split-inventory Method.—One method devised by the commissions to allow for rapidly changing price levels after the World War was to apply the prices prevailing before 1917 to all property constructed previous to that date and to allow actual costs for property constructed during the period of high prices. This was further modified by taking any previous valuation rate base, determining the index number prevailing for materials and labor at that time and at the time of the new valuation, and then multiplying the value in the previous rate base by the ratio of these index numbers. This practice applied to old construction, the new construction being valued at present prices modified by the price-trend index. The method came to be known as the "split-inventory method." Its use permitted a new valuation to be made much more rapidly than where the entire property was to be inventoried, and it seemed to serve very well during rapid price fluctuations. Objections arose to the use of this method in that it did not carry out the mandate of the Supreme Court for a determination of present value of the actual property used and useful. The previous valuation would not apply

¹ *Washington Heights Taxpayers Ass'n v. New York Edison Co.* (N.Y.), P.U.R. 1932E, 218; *Kings County L. Co. v. Prendergast*, 7 F. (2d) 192, P.U.R. 1925C, 705; *Detroit v. Michigan R. Comm.*, 209 Mich. 395, 177 N.W. 306, P.U.R. 1920D, 867; *Re Clinton E. L. Co.* (Conn.), P.U.R. 1933A, 467; *Re Potomac Edison Co.* (Md.), P.U.R. 1933B, 6; *Southern Bell Tel. Co. v. Louisiana Pub. Service Comm.*, 187 La. 137, 174 So. 80 (1937), 18 P.U.R. (N.S.) 1.

adequately, for many items had been removed and replaced since the previous inventory and the condition of the property had changed, so that its efficiency of operation had lessened due to obsolescence and inadequacy of considerable portions, on account of changes in the art caused by inventions, changing population trends, changes in laws or ordinances, competition, etc. The old inventory was given a price, not according to the new trend, but according to the trend previous to some particular date; this led to inaccuracies.¹

The United States Supreme Court disapproved the use of the split-inventory method in the Southwestern Bell Telephone Company Case. It is interesting in this connection, however, to read the dissenting opinion in this case written by Justice Brandeis. The citation from this decision of the majority of the judges follows:

Failure of a commission in valuing public utility property for rate making to accord any weight to the greatly enhanced cost of material, labor and supplies at the time of the valuation constitutes reversible error in a proceeding attacking rates as confiscatory, and is in conflict with the Fourteenth Amendment of the Federal Constitution.—*State ex rel. Southwestern Bell Tel. Co. v. Missouri Pub. Service Comm.*, 262 U.S. 276, 67 L. ed. 981, 43 Sup. Ct. 544, P.U.R. 1923C, 193.

This was further elucidated in the following Federal court case:

The cost of additions to a plant since a prior determination of public utility value, although relevant and to be considered, is not the final test and does not necessarily fix the value, since property may be worth more or less than its actual cost. Present value cannot be determined by an addition of the cost of improvements or of their value to a value fixed at a previous date.—*Indianapolis Water Co. v. McCart*, 13 F. Supp. 110 (1936), 12 P.U.R. (N.S.) 478.

¹ Re Potomac E. P. Co. (D.C.), P.U.R. 1923D, 579; Re Capital City Water Co. (Mo.), P.U.R. 1928C, 436; Waukesha Gas & E. Co. v. Wisconsin R. Comm., 191 Wis. 565, 211 N.W. 760, P.U.R. 1927B, 545; Re Portland E. P. Co. (Ore.) P.U.R. 1930D, 4; Re Seattle Gas Co. (Wash. 1934), 3 P.U.R. (N.S.) 433; Re Mobile Gas Co., 193 Fed. 208, P.U.R. 1924B, 644.

CHAPTER IV

AUXILIARY EXPENSE ITEMS

Overhead.¹—The item of overheads in construction and valuation is one of varying meaning, rather indefinite in some instances but nevertheless real. Nearly every family in this country is the possessor of an automobile, which has probably been taken to a garage for repairs. If the garage owner pays his mechanics an hourly wage of \$0.75, the customer receiving an itemized bill will see an item for labor at some larger amount, say \$1 per hour. The extra \$0.25 that the garage owner collects, plus the profit he makes on the sale of the repair parts, pays his other expenses and profits. These “other expenses” include interest on money he has invested in tools and machinery, rent of building, heating, lighting, and power costs, wages to office help, and payment of wages during short periods when the men are idle, such items being usually referred to as “overhead expenses.”

Before bidding on a new job, a contractor makes a careful estimate of (1) the materials he will require and their unit costs; (2) the number of men, together with the length of time it will take them to perform the work, and the wages each is to be paid;

¹ A broader view of costs of material and equipment than is ordinarily taken necessarily presents itself. When one purchases a suit of clothes for, say, \$50, the thought that it has cost only this amount persists. The cost is, however, more than this amount. To obtain the suit, one must spend time selecting the tailor and then the material, having the tailor make the necessary preliminary measurements, returning to his shop several times afterwards for fittings, and then receiving the finished garment. The cost to the purchaser, is, therefore, the amount paid the tailor plus the value of the purchaser's time in the selection of the materials and in the fitting and delivery. A large corporation usually gives the responsibility of purchasing its requirements to a purchasing agent, so that the cost of goods is the amount paid the vendor plus the salary and expense of the members of the purchasing department. If the goods are carted to a warehouse, the cost at that point includes the expense of transporting them from the point of purchase to the warehouse. A unit price in valuation must necessarily be specified as to where the unit is assumed to be located, whether in place of service, in the warehouse, or elsewhere.

(3) incidental expenses, such as lawyer's fees in drawing up contracts; (4) insurance premiums covering building insurance as well as workmen's compensation and liability insurance; and (5) other direct expenses that are not included in the foregoing. The contractor then totals these items and adds an amount, usually referred to as "overhead." This last item helps to pay for (1) expense of keeping an office, a warehouse, the use of tools and other equipment; (2) salaries of regular employees, such as foremen, who are a necessary part of his organization, and who are kept on the pay roll during dull periods when little or no work is available.

The several items of expense incurred in putting a piece of equipment in place and in working condition may be listed as follows:

1. Invoice cost: this is the amount paid the vendor.
2. Transportation: freight from source of supply to city of final destination.
3. Cartage: conveying from freight depot to warehouse.
4. Purchase: Portion of cost of operating the purchasing department allocated to the particular piece of equipment.
5. Warehouse: Portion of warehouse expense allocated to the particular piece of equipment.
6. Outgoing transportation: conveying from the warehouse to location.
7. Erection and installation: (a) labor, (b) engineering, (c) supervision, (d) interest, (e) insurance, (f) legal.
8. Miscellaneous: those items of cost not included in the foregoing.

In order to arrive at the total of the preceding eight items, there might be added to (1) a percentage representative of average conditions. The total of the first five items might be increased by another percentage. It is needless to say that the percentage added in the first instance would be larger than in the second. Also, it is at once apparent that, unless the starting point—whether (1), (2), (3), etc.—is known, it is useless to compare percentages added for overhead expense.

The price of individual units of construction (these may be small and numerous or large and few), located in position ready to operate, are sometimes referred to as unit prices, although unit prices may as well be those charged by the factory. For the purpose of this introductory section, prices of each unit will be assumed as falling somewhere between the minimum (price

charged by the factory) and the maximum (money invested in the unit as located and ready to function). Even though the eight items listed above are included in the unit price, there are other costs that have been incurred, such as promotion and financing, organization, taxes during construction, extra cost of piecemeal construction, contractor's profit or the equivalent, and contingencies and omissions (necessary when estimates are used instead of actually recorded figures, to allow for oversights on the part of the appraisers).¹ Suffice it to say, the overheads are real and do exist and must, therefore, be determined, as illustrated in the following citations:

"Structural overheads are an actual, tangible part of the cost of the physical property. There are certain expenses inevitable in the construction of a property which are necessarily and properly a part of its cost, but which are not capable of physical identification after the completion of the construction work. These items cannot be covered in the estimate of the cost of reproduction by the application of specific unit prices. Their nature is such that they attach to a whole or a large part of the property rather than to any particular unit." *Indianapolis E. Co. (Ind.)*, P.U.R. 1923D, 449. "Proper allowance for construction overheads in a prudent investment cost estimate should not be disallowed on the ground that no such overhead costs appear on the records when the utility's books do not purport to go back and show total disbursements for construction, but the engineers arrived at the estimate by computing what labor and material should have cost at the respective dates involved." *Monroe Gas L. & Fuel Co. v. Michigan Pub. Util. Comm.*, 292 Fed. 139, P.U.R. 1923E, 661.

Construction.—The entire cost of construction of a project is made up of a number of component parts, such as "material" and "labor," and the belief that certain expenses only are

¹ *Moritz v. Edison E. Ill. Co. (N.Y.)*, P.U.R. 1917A, 364; *Elizabethtown Gas L. Co. v. Public Util. Comm.*, 95 N.J.L. Rev. 18, 111 Atl. 729, P.U.R. 1920F, 1001; *Boise Artesian Water Co. v. Public Util. Comm.*, 40 Idaho 690, 236 Pac. 525, P.U.R. 1926A, 195; *Re Clarksburg L. & H. Co. (W. Va.)*, P.U.R. 1928B, 291; *Re Louisville Hydroelectric Co. (Fed. P.C. 1934)*, 1 P.U.R. (N.S.) 454; *Enck v. Biglerville Water Co. (Pa.)*, P.U.R. 1925E, 110; *Re Iroquois Gas Corp. (N.Y.)*, P.U.R. 1930D, 30; *Yonkers E. L. & P. Co. (N.Y. 1935)*, 6 P.U.R. (N.S.) 132; *Department Pub. Service v. Pacific P. & L. Co. (Wash. 1936)*, 13 P.U.R. (N.S.) 187; *Re Westchester L. Co. (N.Y. 1936)*, 15 P.U.R. (N.S.) 299.

included under each caption has often resulted in misunderstanding, especially on the part of the ordinary citizen. It has already been shown that the cost of material may and usually does include other expenses besides the invoice cost. If material is being furnished under contract, some legal expense was probably incurred in preparing the specifications and contracts for its purchase; so the accountant must decide whether to include this legal expense with the material cost or to include it elsewhere. In connection with the labor cost, he must decide where superintendence begins and where labor ends. If workmen's compensation insurance is paid, shall it be included as a part of the labor cost, or shall it be included under "insurance"? Now that pay rolls are taxed, shall this tax become a part of labor, or shall it be listed with the other taxes? To make the several components useful and consistent for comparison, it is, therefore, necessary to define them by stating what expenses each one is to include. Such definitions are provided by the several state commissions and also by the Federal commissions. Without attempting to justify the exclusion or inclusion of certain expense items, the several components of construction cost will be listed with a brief statement of the expense items to be included.

a. LABOR.—Includes wages and salaries paid to workmen and other expenses directly associated with the workmen, such as workmen's compensation insurance, pay-roll taxes, commissary and housing, and all other similar items. Wages paid to those who direct the work are not included.

b. MATERIALS AND SUPPLIES.—Includes the amount paid the vendor; tariffs, taxes, and imposts if any; inspection; unloading; transportation to warehouse except where the material is taken directly to the location where it is to be erected; purchasing expense; and expenses incurred in connection with warehouse operations.

c. TRANSPORTATION.—Includes cost of carrying workmen to and from the construction job, transporting materials and supplies to the location, and moving of tools and other machinery used for construction purposes from one point of use to another.

d. INJURIES AND DAMAGES.—Includes such expense as may be occasioned by injuries to persons, damages to property of others, legal and other expenses incurred in defending actions that may be brought against the utility, and the cost of investigation of

claims without legal action. Insurance recovered because of premium payments is credited to this account, although the premiums are charged to "insurance."

e. INSURANCE.—Includes premiums paid for protection against loss by fire, flood, windstorms, explosions, etc.; for protection against damages to property of others; for injury to or death of persons other than employees; and for anything it is deemed necessary to cover by insurance, except workmen's compensation.

f. LEGAL EXPENSES.—Includes attorney's fees for drawing contracts, condemning land for right of way, drawing deeds, filing fees necessary for construction permits, and other legal expenses incurred during the construction, except those connected with "injuries and damages."

g. INTEREST.—Covers the carrying charges for the money expended during the construction period and up to the time when the property goes into operation.

h. BROKERAGE AND BOND DISCOUNT.—Covers the expense of securing the money and issuing and disposing of the securities.

i. ORGANIZATION.—Covers general office expense, securing bids, preparing contracts, salary of officials required in the construction, and general superintendence chargeable to construction.

j. ENGINEERING.—Covers the cost of preparing working drawings, specifications, and contracts; supervision; progress reports; and estimates for payment, together with expense for shop inspection, tests, and field engineering.

k. CONTINGENCIES.—Covers incomplete inventories, unforeseen difficulties of construction, and any and all other items of expense that cannot be foreseen.

l. INCIDENTALS.—Covers all incidental construction expense to the company that lies outside the contract cost, such as extras in the contract price. These extra expenditures may be due to small changes in design, interference with construction for various causes, cost of trial operation, and cost of insurance and operating expense during construction where the construction is an addition to a utility already in operation.

Early Allowances.—Most early allowances for overheads were "blanket" percentages, or else several of the preceding items were consolidated under a few general heads. In the appraisal of the Consolidated Traction Company of Chicago, made in 1910, the allowances were as follows:

| | Per Cent |
|---|----------|
| Organization, engineering, and incidentals..... | 14.6 |
| Legal expenses, interest, and contingencies..... | 5.8 |
| Conducting work, furnishing equipment, and brokerage (a construction bonus)..... | 18 |
| Total overhead charges..... | 38.4 |

In the Des Moines Water Rate Case (*Des Moines Water Co. v. City of Des Moines*, United States Circuit Court, Southern District of Iowa, Central Division, Sept. 16, 1910):

| | Per Cent |
|--|----------|
| Engineering and superintendence..... | 4.5 |
| General expenses, legal and contingencies..... | 6.1 |
| Interest during construction..... | 7.1 |
| Contractor's profit..... | 10.8 |
| Total overhead expenses..... | 28.5 |

In the Great Britain Railway and Canal Commission, Appraisal of the Telephone Plant for Purchase, report made to His Majesty's Postmaster General, Jan. 13, 1913, the items allowed were as follows:

| | Per Cent |
|--|----------|
| Ordering and storing material..... | 2.6 |
| Local engineering supervision..... | 6.4 |
| District and local administration..... | 2.6 |
| Head-office administration and engineering..... | 5.5 |
| Interest during construction..... | 4.5 |
| Contractor's profit..... | 2.9 |
| Rent, maintenance, way leave payments, and insurance until plant becomes revenue earning..... | 2.0 |
| Cost of obtaining way leaves..... | 1.0 |
| Cost of obtaining subscribers' agreements..... | 1.5 |
| Cost of raising capital..... | 2.4 |
| Total overhead charges..... | 31.4 |

"Fifteen per cent of the 'bare bones' value of telephone property was added for overhead expenses such as organization expense, legal expenses, engineering and supervision of construction, contingencies and losses, and interest during construction." *Re Platte County Independent Tel. Co. (Neb.)*, P.U.R. 1922D, 303. "Five per cent of the tangible values of land, buildings, and structures, pumping station, and distribution system of a municipal system were included for construction, engineering, and consultation not charged to operating expenses." *Cavanaugh v. Whitefish Municipal Water Util. (Mont.)*, P.U.R. 1922E, 198.

Promotion and Financing.—Before any new enterprise can be started and the public can be given the benefit of its services, some person or group of persons must have the courage to plan the enterprise. When the enterprises are new in character, these services require more courage and foresight than do those which have been demonstrated in other localities. The persons who make the original plans and who risk their money and reputations are called promoters. They are rewarded by certain concessions of capital stock or special profits in most enterprises, but, whatever the means of reward, these costs are a real part of the expenses of starting the enterprise on its way.¹ This fact was well stated in an early case before the New York Commission, as follows:

Another subject of great interest and importance is the compensation, if any, to which the promoters of the enterprise should be entitled for their services. Promotion has been so extensively abused, and has been so universally used as a cover for abuses in capitalization, that it has come to be regarded as a term of reproach, and as a device to work schemes of robbery upon the investing public. No reason is apparent why this should necessarily be so. The honest services of a capable promoter are indispensable to the flotation of every comprehensive and far-reaching scheme of development in the railroad world, or elsewhere. A clear vision to see opportunities, ability to demonstrate them to others, and energy to push to completion works untried, but of great moment, are indispensable to material development and should be fairly and even liberally rewarded by the public, which receives the benefits of these works. Such rewards, however, should be put on a clear basis of business principles, should be of sufficient magnitude to encourage rather than to discourage enterprise, and should not be so great as to make an exorbitant demand which is perpetual in nature, upon the community to be served. They are to be treated simply as just payment for services performed for the corporation, which services are valuable, and in many cases indispensable. Such services should be paid for upon the basis of what they are fairly worth, having regard to all circumstances of the case.—*Re Rochester C. E. Traction Co.*, 1 P.S.C. N.Y. (2d Dist.) 166.

The process of financing a utility consists in the issuance of stocks and bonds and in disposing of these to the public through

¹ *Kansas City, C. C. & St. Joseph R. Co.* (Mo.), P.U.R. 1920B, 37; *Danville v. Southern R. Co.*, 8 I.C.C. 409; *Re Potomac E. P. Co.* (D.C.), P.U.R. 1917D, 563; *St. Louis v. Public Service Comm.*, 326 Mo. 751, 34 S.W. (2d) 507, P.U.R. 1931B, 448; *Re Pacific Gas & E. Co.* (Cal. 1934), 1 P.U.R. (N.S.) 1; *Re Milwaukee E. R. & L. Co.* (Wis.), P.U.R. 1930C, 426.

financing houses. Where a considerable part of the financing is done by the sale of bonds, it is necessary to sell these bonds at less than par, a portion or all of the bond discount being allowed for the payment to the financial houses for their services in disposing of these bonds to their customers. Sometimes common stock is also issued as a bonus with the sale of preferred stock or bonds. None of this financial operation adds to the value of the property. The utility will have the same physical value no matter whether the money is furnished by a single individual, is acquired entirely by the sale of stock, or is secured partly by the sale of bonds. For this reason, most commissions and courts have made no allowance as value for such an item. This cost is considered, however, in determining the proper rate of return on the rate base.

If one considers the labor and expense necessary in floating the securities, it appears that this expense should be included as a part of the construction cost. It is somewhat like the fees paid an architect or engineer for drawing plans and specifications. There is danger, however, in so considering this expense, for an enterprise considered hazardous by the investing public will have a greater difficulty in disposing of its securities than one not so considered. Therefore, by this means a speculative venture would become more valuable because of its risk, something that does not appear to be acceptable.

Let us consider that among the securities are 20-year bonds in \$1,000 denominations at 4 per cent. Because of the nature of the enterprise, the relation of the amount to be raised by bonds to the amount to be secured from the sale of stock, or for other reasons, the persons contemplating the purchase of the bonds feel that the interest rate of 4 per cent is not sufficient to warrant their purchasing the bonds at par. The promoter then has the choice of raising the interest rate to some higher figure, say, 5 or 6 per cent, or to accept less than \$1,000 for each bond. The construction cost is not altered by the situation when he gets only \$900 for each bond. It simply means that he will have to sell approximately 10 per cent more bonds to raise the necessary money. What is affected is the amount of fixed charges he obligates himself annually to pay during the life of the bonds, for, in addition to the \$40 for each bond, he must set aside enough to accumulate to \$1,000 at the end of the 20-year period. The bond is in reality

a mortgage note, which guarantees to the holder a prior lien against the property and, for that reason, usually commands a lower interest rate than stock.¹

The following citations give opinions of the Supreme Court, a state supreme court, and a state commission:

"It is not error for a court to refuse to include an allowance for hypothetical brokerage fees in the base or present value, for the purpose of determinating whether rates are confiscatory." *Galveston v. Galveston E. Co.*, 258 U.S. 388, 66 L. ed. 678, 42 Sup. Ct. 351, P.U.R. 1922D, 159. "While the books of the company involved in this proceeding did not include such expenditures in the past and the record was otherwise silent on the subject, the Commission was of the opinion that this failure to show such expenditures did not of itself preclude the inclusion of an estimated allowance therefor in the reproduction cost. Due consideration of the fact that the record failed to show that the company actually incurred such expense was to be given in determining fair value." *Ruttle v. Chellenham & Abington Sewerage Co. (Pa.)*, P.U.R. 1931A, 114; appealed to superior court and decided in 122 Pa. Super. 252, 186 Atl. 149 (1936), 15 P.U.R. (N.S.) 99.

"There is some confusion of terms to describe or define cost of financing, which is sometimes erroneously termed 'cost of obtaining money.' It is often spoken of as 'brokerage,' sometimes as 'discount,' and on other occasions as 'brokerage and discount.' A clear distinction may be made by stating that discount, while a function of cost of obtaining money, is not an element in cost of financing. Discount is the difference between the par value of the securities and the price (less than par) paid therefor by the investing public. Discount is a distinct function of interest rate and, therefore, of time, in that it is an adjustment of the stated rate of return on a security to yields prevailing in the

¹ *Alabama P. Co. (Fed. P.C.)*, P.U.R. 1932D, 345; *Reno P. L. & Water Co. v. Public Service Comm.*, 300 Fed. 645, 198 Fed. 790, P.U.R. 1923E, 485; *Wabash Valley E. Co. v. Singleton*, 1 F. (2d) 106, P.U.R. 1932B, 225; affirmed 287 U.S. 488, 77 L. ed. 447, 53 Sup. Ct. 234, P.U.R. 1933A, 433; *Dayton P. & L. Co. v. Ohio*, 292 U.S. 290, 78 L. ed. 1261, 54 Sup. Ct. 647 (1934), 3 P.U.R. (N.S.) 279; *New York Tel. Co. v. Prendergast*, 36 F. (2d) 54, P.U.R. 1930B, 34; *Charleston v. Public Service Comm.*, 95 W. Va. 91, 120 S.E. 398, P.U.R. 1924B, 601; *Mayor of Hyattsville v. Washington Suburban Gas Co. (Md.)*, P.U.R. 1929E, 4; *Public Service Comm. of Missouri v. Missouri Pub. Service Co. (Mo. 1936)*, 15 P.U.R. (N.S.) 1; *Public Service Comm. of Missouri v. Union E. L. Co. (Mo. 1937)*, 17 P.U.R. (N.S.) 337; *Re Springfield Gas Co. (Ohio 1937)*, 19 P.U.R. (N.S.) 1.

investment market at the time the security is offered to the public. It follows that there is no more justification for capitalizing discount, which is applicable to the entire life of the bond, than to capitalize interest over the entire life of the bond, and therefore, discount should not be considered in the determination of any rate base." *Public Util. Comm. v. Solar Electric Co.* (Pa. 1938), 24 P.U.R. (N.S.) 337.

Organization and Legal Expenses.—These two items are usually classed together. The definition of organization expenses is well set forth in the following citation taken from the *Proceedings of the National Association of Railway and Utility Commissioners* (1920), Appendix I, p. 31:

Organization expenses should include all fees paid to the government for the privilege of incorporation and all office and other expenditures incident to organizing the corporation or other enterprise and putting it into readiness to do business. This covers cost of preparing and distributing prospectuses, cost of soliciting subscriptions of stock, cash fees paid to promoters, and the actual cash value at the time of the organization of securities paid to promoters for their services in organizing the enterprise, counsel fees, cost of preparing and issuing certificates of stock and cost of procuring certificates of necessity from state authorities and other like costs; also costs incident to preparing and filing certificates of authorization of increase of capital stock and to the negotiation and issue of stock thereunder, and of preparing and filing certificates of amendment or articles of incorporation. This amount should not include any discount on stock or other securities issued, nor should it include any costs incident to negotiating loans or selling bonds and other evidences of indebtedness.—*Proc. Nat. Ass'n of Railway & Utility Comm'rs* (1920), Appendix I, p. 31.

An allowance for this expense in a reproduction-cost estimate has been approved by the Supreme Court in the following:

The rejection or reduction of preliminary organization expenses, including incorporation fees to the government and other fees and expenses incident to the organization of a utility such as attorney's fees and the cost of preparing and issuing certificates of stock, upon the ground that there is no actual proof of such expenditures, is erroneous when the estimate is part of a reproduction cost estimate by Commission engineers which is uncontested.—*Ohio Utilities Co. v. Public Util. Comm.*, 267 U.S. 359, 69 L. ed. 656, 45 Sup. Ct. 259, P.U.R. 1925C, 599.

The allowance for this item is usually 1 to 2 per cent of the other physical items of the property.¹

Engineering and Superintendence.—The allowance for this item is approximately 5 per cent of the value of the physical plant. A brief definition of this item has been given under Definitions, early in this chapter.² Further considerations are contained in the following citation:

The following items are to be included under the allowance for engineering and superintendence; (a) Salaries and expenses of engineering and superintending force; (b) Cost of preparation of specifications; (c) Cost of preparation of detailed plans; (d) Cost of setting lines and grades; (e) Cost of inspection work; (f) Cost of preparation and letting of contracts; (g) Cost of making estimates for contractors; (h) Purchase of material and supervision of labor where work is done by contract; (i) Cost of final tests and adjustment of contracts; (j) Cost of placing the plant in successful operation.—*Lincoln v. Lincoln W. & L. Co. (Ill.)*, P.U.R. 1917B, 1.

Interest during Construction.—When a utility plant is constructed and put into operation, it requires a certain capital expenditure. The land and rights of way must be purchased prior to the construction. It takes a considerable period of time to construct the enterprise and to have it ready to deliver service to the customers. During this period no earnings can be secured because no service has yet been delivered. The amount invested in real estate and easements would be unable to earn interest dur-

¹ City of Libby v. Libby Water & E. Co. (Mont.), P.U.R. 1922E, 402; Worcester E. L. Co. v. Attwill, 23 F. (2d) 891, P.U.R. 1929B, 3; Dayton P. & L. Co. v. Ohio, 292 U.S. 290, 78 L. ed. 1261, 54 Sup. Ct. 647 (1934), 3 P.U.R. (N.S.) 279; Grafton County E. L. & P. Co. v. State, 78 N.H. 330, 100 Atl. 668, P.U.R. 1917E, 345; Re Alabama P. Co. (Fed. P.C.), P.U.R. 1932D, 345; Re Louisville Hydroelectric Co. (Fed. P.C. 1934), 1 P.U.R. (N.S.) 454; Re Cities Service Co. (Kan.), P.U.R. 1933A, 113; Brooklyn Borough Gas Co. v. Prendergast, 7 F. (2d) 628, P.U.R. 1926A, 412; Re Union E. L. & P. Co. (Mo. 1937), 17 P.U.R. (N.S.) 337; Lone Star Gas Co. v. City of Fort Worth (Tex. 1937), 20 P.U.R. (N.S.) 89; Re Arkansas-Louisiana Gas Co., 17 F. Supp. 447 (1937), 17 P.U.R. (N.S.) 241.

² Holland v. McGuire (Mich.), P.U.R. 1920B, 149; City of Libby v. Libby Water Co., *supra*; Maires v. Flatbush Gas Co. (N.Y.), P.U.R. 1920E, 930; Worcester E. L. Co. v. Attwill, *supra*; Re Cities Service Co., *supra*; Re Racine Water Co. (Wis.), P.U.R. 1917D, 277; Re M & M Pipe Line Co. (Tex. 1936), 11 P.U.R. (N.S.) 234; Public Service Comm. of Missouri v. Missouri Pub. Service Co. (Mo. 1936), 15 P.U.R. (N.S.) 1.

ing the entire period of construction, and perhaps for a short time in addition, while the real estate is being acquired piece by piece. That portion of the capital invested in the remainder of the plant would not need to be secured before the start of construction. Bonds and stock could be sold gradually during the period of construction so as to save in the interest payments. It is customary to allow for this interest during construction in the valuation of the property for rate-making purposes. The rate of interest should be fixed at the rate prevailing for like risks in the immediate neighborhood. The value of real estate and easements should be multiplied by this rate of interest and also by the period required for the construction to the point of operation. It is customary to allow the full rate on one-half the remaining plant value or one-half the rate on the full value for the period of actual construction.¹ This allowance is known as "interest during construction." The necessity for this allowance is well illustrated in the following:

It is a matter within the observation and knowledge of all that a plant, the cost of whose physical units put together into a complete plant approximates \$100,000, cannot be constructed instantly. It takes time to assemble the physical properties, and still greater length of time to put these units into place, where they may be used to render service. During this period, the capital invested must of necessity be idle, and no income can be received therefrom. When the construction of the plant is completed, no willing seller, who is not forced to sell, would take for his plant the cost of the physical units and the cost of the labor and construction, because the plant has cost him in addition thereto the use of the capital, or a certain part thereof, invested in the physical properties during the time of construction. A willing buyer could afford to pay, or would pay, more than the actual cost of labor and material, assuming that the plant has been economically constructed, because such cost would represent the total expenditures the purchaser

¹ Brunswick & Topham Water District v. Maine Water Co., 99 Me. 371, 59 Atl. 537; Ben Avon v. Ohio Valley Water Co. (Pa.), P.U.R. 1917C, 390; Re Alabama P. Co. (Fed. P.C.), P.U.R. 1932D, 345; Ohio Util. Co. v. Public Service Comm., 267 U.S. 359, 69 L. ed. 656, 45 Sup. Ct. 259, P.U.R. 1925C, 599; Re Chesapeake & Potomac Tel. Co. (Md. 1934), 1 P.U.R. (N.S.) 346; Re Wisconsin Tel. Co. (Wis. 1936), 13 P.U.R. (N.S.) 224; Yonkers R. Co. v. Maltbie (App. Div.), 296 N.Y. Supp. 411 (1937), 19 P.U.R. (N.S.) 348; Re Bluefield Water Works & Improvement Co. (W. Va.), P.U.R. 1927B, 275; Alabama P. Co. v. McNinch, 94 F. (2d) 601 (1938), 21 P.U.R. (N.S.) 225.

would have to make in order to construct the plant himself. No case has been cited, and in our investigation we have found no case, involving this question, where a reasonable amount has not been considered and allowed for loss of interest during construction as part of the cost of construction.—*Pioneer T. & T. Co. v. Westernhaver*, 29 Okla. 429, 118 Pac. 354, 33 L.R.A. (N.S.) 1209, Jan. 10, 1911.

A "blanket" rate for such an allowance is made as follows:

The estimate of the Commission engineer, based upon a construction period of 2 years, and on an interest rate of 6 per cent, was as follows:

| Account | Cost of reproduction | Interest during construction | |
|--------------------------------|----------------------|------------------------------|--------------|
| | | Per cent | Amount |
| Land..... | \$ 210,080.64 | 10 | \$ 21,008.06 |
| Buildings..... | 760,821.72 | 6 | 45,649.30 |
| Central office equip..... | 1,391,169.85 | 6 | 83,470.19 |
| Other equipment..... | 32,053.78 | 3 | 961.61 |
| Station apparatus..... | 633,582.24 | 0 | 0.00 |
| Station installations..... | 283,060.58 | 0 | 0.00 |
| Interior block wires..... | 14,168.96 | 0 | 0.00 |
| Private branch exch..... | 131,881.44 | 1 | 1,318.81 |
| Booths & spl. fittings..... | 51,561.09 | 0 | 0.00 |
| Pole lines..... | 4,020,921.74 | 6 | 241,255.30 |
| Aerial cables..... | 1,374,388.59 | 5 | 68,719.43 |
| Aerial wire..... | 2,727,937.92 | 4 | 109,117.52 |
| Underground conduit..... | 638,671.59 | 6 | 38,320.30 |
| Underground cable..... | 890,850.77 | 5 | 44,542.54 |
| | \$13,161,150.91 | 4.97 | \$654,363.06 |
| Contingencies and omissions... | 354,972.43 | 4.97 | 17,642.13 |
| | \$13,516,123.34 | 4.97 | \$672,005.19 |

This gives the blanket rate of 4.97 per cent on the total cost of installation.—*Re Mountain States T. & T. Co. (Colo.)*, P.U.R. 1917B, 198.

Taxes during Construction.—The matter of the allowance for taxes during construction usually depends upon the construction period of the utility. Taxes are usually assessed on property at a certain time of the year, so that property owned at that particular time will be placed on the tax rolls. Construction begun and completed within a year may, therefore, escape taxes until after construction is completed, depending upon when the work was

started, the date of assessment, and how long a period is needed for the construction. Taxes are usually paid on the lands and structures of a utility in use prior to construction. They are not assessed on the remainder of the project unless it requires considerably over one whole year including the time of making assessments, and then only on that portion which is in place at that time. Taxes on the utility after operation has commenced are paid by the utility and charged to operating expenses. The same is usually true of piecemeal construction made during operation.¹

This subject was discussed in the following case:

In our opinion this method of figuring taxes is erroneous. There is no relation between the assessed value for taxation purposes and the original cost of the property. If any relation does exist it is between the assessed value and the reproduction cost less depreciation on the date of assessment. To determine the theoretical assessment on the property when new, the ratio between the assessed value and the reproduction cost new less depreciation should be applied to the cost of reproduction new. The tax rate should then be applied to this theoretical assessment to determine the amount of taxes that would be levied. This amount should then be apportioned between construction and operation in the ratio of the period of time that the property was under construction to the time it was being operated during the year when the tax was paid.—*Public Service Comm. v. Arkansas-Missouri P. Co.* (Mo. 1935), 8 P.U.R. (N.S.) 113.

Insurance during Construction.—Where the property is constructed by the utility itself, it must pay insurance on the property as soon as it is in place and until it is put into operation. This will include property insurance for the buildings and equipment and liability insurance against injury to workmen engaged in the construction. Where the work is done by a contractor, he must pay this insurance and include it in his contract price for the construction. The item is usually allowed in reproduction-cost estimates wherever the amount can be proved.² The

¹ Re Metropolitan S. R. Reorganization (1912), 3 P.S.C.N.Y. (1st Dist.) 113; Re Omaha & Council Bluffs S. R. Co. (Neb.), P.U.R. 1924A, 360; Re Union E. Co. (Mont.), P.U.R. 1928E, 397.

² Re Helena L. & R. Co. (Mont.), P.U.R. 1920D, 668; Re Chesapeake & Potomac Tel. Co. (Va.), P.U.R. 1926E, 483; Arvada v. Arvada E. Co. (1916), Colo. P.U.C. 93; Commercial Club v. Missouri Pub. Util. Co.

Missouri Commission made an allowance of 2 per cent of the reproduction cost of electric property for insurance during construction, including workmen's compensation, public liability, and property damage.¹

Contractor's Profit.—The question of an allowance for contractor's profit in the rate base usually depends upon whether a contractor was actually employed or whether the company itself did the construction work. The allowance should be 3 to 10 per cent of the construction work under consideration.² Arguments for and against this allowance are given in the following:

"The claim made for an allowance for contractor's profit rests on the assumption that the contractor performs a real service in providing a supervisory and clerical staff, an organization and equipment, and, in general, facilities for the work of construction superior to those of the company. His profit is intended to cover the expense incurred over and above the cost of material and labor. The services of the contractor are called in on the theory that it is cheaper to have the work performed by him than for the company to undertake construction itself. It is assumed that he can lower prices for material and labor, and enjoys economies through carrying on work on a large scale. Otherwise, there is no justification for employing a contractor. Where, however, the work is actually done by the company, the company necessarily provides the organization and equipment, and itself incurs the expense which the contractor would bear. These expenditures necessarily appear on the books. Where the valuation follows closely the actual conditions under which the plant was built, and all other expenditures actually

(Mo.), P.U.R. 1915C, 1017; Roundup v. Roundup Coal Mining Co. (Mont.), P.U.R. 1928E, 396; Public Util. Comm. v. New England T. & T. Co. (R.I. 1925), P.U.R. 1926C, 207; Colorado Springs L. H. & P. Co. (Colo.), P.U.R. 1917F, 395; Campbell v. Hood River Gas & E. Co. (Ore.), P.U.R. 1915D, 855; Ben Avon v. Ohio Valley Water Co. (Pa.), P.U.R. 1917C, 390; Casanave v. Overbrook Steam Heating Co. (Pa.), P.U.R. 1926A, 600; Re Clarksburg L. & H. Co. (W. Va.), P.U.R. 1928B, 290; Re Racine Water Co. (Wis.), P.U.R. 1917D, 277; Milwaukee E. R. & L. Co. v. Milwaukee (Wis.), P.U.R. 1918E, 1.

¹ Sullivan v. Missouri E. P. Co. (Mo. 1935), 6 P.U.R. (N.S.) 225.

² Worcester E. L. Co. v. Attwill, 23 F. (2d) 891, P.U.R. 1929B, 2; Re Alabama P. Co. (Fed. P.C.), *supra*; Public Service Comm. of Missouri v. Ozark Util. Co. (Mo. 1937), 18 P.U.R. (N.S.) 408; Sullivan v. Hingham Water Co. (Mass.), P.U.R. 1926C, 371; Blytheville v. Blytheville Water Co. (Ark. 1936), 15 P.U.R. (N.S.) 177.

made, it is absurd to claim that to these actual expenditures there should be added a hypothetical contractor's profit. It is palpably inconsistent to assume costs as high or higher than the actual costs to the company and still claim that an allowance should be made for contractor's profits on the theory that reproduction would be done through a general contractor." *Hermann v. Newton Gas Co.* (N.Y.), P.U.R. 1916D, 825. "No allowance should be made for contractor's profit unless the evidence clearly shows that the property was originally constructed by a contractor, or the evidence is conclusive that a saving in the cost of construction is clearly indicated by the employment of a contractor because of decreased prices of materials and better performance." *Public Service Comm. v. Missouri Util. Co.* (Mo.), P.U.R. 1932E, 449.

Piecemeal Construction.—In nearly all cases, public utilities existing at the present time began operations on a small scale. As demand for the services by additional customers occurred, the facilities were extended to supply these demands. In addition to the increase because of the greater number of customers served, there has been an increased use of facilities by each customer. In the electric light and power business, this increase has been especially marked. Sometimes it has been so rapid that existing equipment has become inadequate long before reaching the end of its useful life, and the over-all economies accomplished by the addition of new units have been such that existing units have been abandoned. An existing utility, constructed in such a manner as to keep up with the needs of the business, otherwise known as "piecemeal construction," has cost the owners more than if the complete utility were constructed all at once in its present form. In other words, the facilities existing could probably be erected under one contract, even if the prices for material and labor are the same, at a lower cost than when constructed in a piecemeal manner. This is not always the case, but it is usually so.

One reason why this is so may be illustrated as follows: A construction crew of perhaps eight men may build a mile or two of electric line in the outskirts of a city. There may be one service drop to be installed along the route to be traveled by this crew, and they may be asked to install it. Obviously, eight men are not required to do this extra work, so that, if the time of eight men is charged against the service drop, the amount will be greater than it otherwise would be. If the time of two or three

men is charged against the drop, the time of the remaining men will be charged against the construction of the electric line. In either case, the cost is greater than an estimate might reflect unless waste time is taken into consideration.¹

"Some engineers place the extra cost for piecemeal construction as high as 10 to 15 per cent of the total cost of the plant. There are, however, savings in piecemeal construction to offset some of the extra costs. Some of these are due to the designing and superintendence being performed by the regular force, under pay from operating expenses." *Hill v. Antigo Water Co.*, 3 Wis. R.C.R. 623, Aug. 3, 1909. "Expert testimony as to reproduction of cost of gas utility property was rejected where piecemeal methods of construction were assumed, although the property should actually be reproduced as a whole within a period of three years. It was ruled that such estimates of reproduction cost would result in a cost of reproducing the plant retail rather than wholesale through failure to use quantity discounts and other economies incidental to large scale construction." *Department Pub. Works v. Seattle Gas Co.* (Wash. 1934), 3 P.U.R. (N.S.) 433.

Consolidation of Properties.—Where several properties in a given city or district are consolidated into a completed whole, with a central plant and transmission facilities between them, so that the whole system may operate at a lower cost of production, a considerable amount of property must be scrapped and salvaged from the old units that were in the original plants. This condition is true where two competing plants in a city have been merged into one system. Suppose that these plants are for the production and supply of manufactured gas. Each plant will have its own generators, storage facilities, and distribution

¹ *Pioneer T. & T. Co. v. Westenhaver* (1911), 29 Okla. 429, 118 Pac. 354, 38 L.R.A. (N.S.) 1209; *Fuhrmann v. Cataract P. Co.* (1913), 3 P.S.C. N.Y. (2d Dist.) 656; *Southwestern Bell Tel. Co.* (Okla. 1935), 9 P.U.R. (N.S.) 113; *Re Missouri S. R. Co.* (Mo.), P.U.R. 1916C, 607; *Re New York Tel. Co.* (N.J.), P.U.R. 1925C, 767; *Re Chesapeake & Potomac Tel. Co.* (Va.), P.U.R. 1926E, 481; *Manitowoc v. Wisconsin Fuel & L. Co.* (Wis.), P.U.R. 1927D, 737; *Re Crandon Tel. Co.* (Wis.), P.U.R. 1929A, 8; *Lake Forest v. Lake Forest Water Co.* (Ill.), P.U.R. 1915D, 1008; *Re Jackson County L. H. & P. Co.* (Mo.), P.U.R. 1926D, 737; *University City v. West St. Louis Water & L. Co.* (Mo.), P.U.R. 1928D, 322; *Municipal League v. Pacific Gas & E. Co.* (1915), 3 Ariz. C.C. 11; *Hermann v. Newton Gas Co.* (N.Y.), P.U.R. 1916D, 825.

system. When the new organization takes over the entire area, much of the property of one or the other company will be excess equipment, and the company cannot be expected to earn on the total investment. Either some allowance should be made for this loss in the capital account, or the company should be allowed to amortize the extra expense out of the lower operating costs of the combined system. The matter of amortization will be discussed under Expenses in a later chapter.¹

Adaptation and Solidification.—The following definitions of these terms were made by Dwight C. Morgan, engineer:

Adaptation in its application to the problem of reproduction cost is the adjustment of the physical line to its environments and purposes. *Solidification* of roadbed is its settlement to a stable condition. The terms are closely related to each other, yet neither in itself gives adequate expression to, or clearly defines, the meaning and scope of the application.

Both of these terms apply almost entirely to the rate base of railroad properties. The allowance for this item will depend to some extent on the nature of the country through which the road is constructed. Roadbed constructed through mountainous country with rock cuts and fills and with tunnels through rock will have very little allowance. Roads constructed through districts with swampy ground and low country where dirt and fine gravel are used for the fills will have a considerable shrinkage and solidification during the early years of operation. If this condition is cared for out of operating expenses, then it need not be allowed for in the rate base. Varying amounts have been allowed by different appraisal engineers. In the Washington railroad appraisal in 1908, the commission allowed 10 per cent on the cost of grading and surfacing for "seasoning." The Texas, Michigan, and Wisconsin railroad appraisals made no allowance. In *Shepard v. Northern Pacific R. Co.*, 184 Fed. 765, Apr. 8, 1911, an allowance was made and supported by testimony. Allowances run from 8 to 25 per cent in other appraisals.

Severance Damages.—Severance damages may be considered as the opposite of acquirement benefits. They apply to a utility that suffers some damage by the removal of a portion of its

¹ Re Interstate Util. Co. (Idaho), P.U.R. 1924A, 197; Aluminum Goods Manufacturing Co. v. Laclede Gas L. Co. (Mo.), P.U.R. 1927B, 2.

system. These damages may be caused by (1) reduction in operating efficiency, (2) rendering of a portion of the remaining property useless either permanently or for an indefinite period. A gas company may be supplying several communities from a large gas-producing plant and transmitting gas to the several communities by means of pipe lines. If one of these communities should decide to acquire the gas distribution system within its boundaries and erect a gas-manufacturing plant to supply its own needs, it is at once apparent that the portion of the pipe line laid out to serve this community is no longer needed. Furthermore, the utility's gas-manufacturing plant would then be larger than necessary for the remaining business, and the cost to produce a unit of gas would become greater than before. By the severance of this particular distribution system from the remainder of the property, the utility would be damaged to some extent, and payment to the utility for the value of the distribution system only would be inadequate by the amount of the damage suffered.

If the city, instead of erecting its own gas-manufacturing plant, should continue to purchase gas at the city limits from the utility company, the pipe line would not be rendered useless, and the same cost of manufacturing the gas would still prevail; so no damages could be claimed from this source. Taking away a portion of the utility's customers, however, would probably produce some disruption of its organization and a change in its *methods of operation, causing it some additional expense for which it might ask compensation.* Also, the rates prescribed for gas may have to be predicated on a 50-year life of the transmission line, and the severance occurring at a time when the main is, let us say, only 20 years old would mean that the utility was able to accumulate in its depreciation reserve only a portion of the cost of the main; so, unless it received adequate severance damages, it would suffer a loss up to the difference between the cost and the amount of depreciation reserve accumulated. If, however, the transmission pipe is used to supply gas to other cities, the damages suffered would not be so great; if, in addition, the amount of gas supplied were increasing from year to year, the capacity available in the pipe would soon again be utilized, thus affecting the amount of damage suffered by the severance.

These conditions are well brought out by two decisions of the Wisconsin Commission, as follows:

"In ascertaining the value of the distribution system of an electric company for the purpose of sale to a city, amounts may be allowed as severance damages for the excess capacity of a substation, if the city ceases to purchase power from the company; for the space made vacant in the substation by the removal of switchboards and equipment, if the city generates its own power; for the cost of rebuilding the switchboard from the removal of panels, if the panels are removed; and for excess office space during the existence of the lease." *Re City of Chippewa Falls (Wis.)*, P.U.R. 1927A, 545. "Severance damages are not to be included by the Commission in determining the compensation to be paid by a municipality for the acquisition of the local property of an electric company which operates, in addition to such local property, a unified transmission system and steam and hydraulic generating plants." *Wisconsin P. & L. Co. v. Public Service Comm.*, 219 Wis. 104, 261 N.W. 711 (1935), 10 P.U.R. (N.S.) 115.

Two similar decisions of the California Commission are as follows:

"Damage to the business remaining to an electric company after acquisition of the property by a municipality, as distinguished from the damage to the physical property remaining, is, under the law, a compensable item. It is essential that a clear distinction be made between damage to the business which is not taken and in the allowance made for the business actually taken and included in the award or just compensation for the property and rights condemned." *Re Redwood City (Cal. 1937)*, 20 P.U.R. (N.S.) 269. "The California Commission, in determining a just figure of compensation to be paid by the city of Los Angeles for condemnation of certain utility property, considered the following factors in arriving at severance damages to property not taken. In addition to the actual cost of mending the physical severance consideration was given to the cost of money, depreciation, and maintenance on the percentage of the generating and transmission system rendered temporarily and permanently idle, as well as the diminution in intrinsic value of the entire property not taken." *Re Los Angeles (Cal.)*, P.U.R. 1929C, 389.

Payments to Related Companies.—In all cases of contracts between affiliated companies, it must be demonstrated whether or not the amounts paid are no more than the services are reasonably worth; this question is sometimes answered by determining the amounts paid by "strangers in interest" making similar contracts "at arm's length." Also, the profits obtained by the

company rendering the service may offer a clue as to the reasonableness of the charges. Unless the costs of rendering the service are found to be larger than they should be because of mismanagement, fraud, or abuse, it can be assumed that the charges are fair and reasonable when the profits are reasonable.

The operation of any business requires planning, and how this shall be paid for is a matter of choice. The method of obtaining and paying for the planning is not the basis of determining whether charges are exorbitant. A utility may purchase its own equipment by having each department head purchase what is necessary for his department; or it may concentrate the purchases in the hands of a purchasing agent who may or may not be a member of the utility family. Unless the purchasing department can show a saving because of its existence, the cost of operating the department may well be questioned. Many unified public-utility systems, operating under a holding company, have purchasing departments and contracting companies under common control. In some of these systems, very little engineering or construction work is done by the force of the operating subsidiaries. In these cases, construction work requires a definite amount to be paid to the holding company for the head-office expense of engineering and supervision, as well as for assistance in the financing. In the Associated Bell Telephone Companies, under the American Telephone and Telegraph Company, the equipment is manufactured by the Western Electric Company, a subsidiary of the main holding company. In the consideration of the rate base for any subsidiary company, the amount of payment to the holding company to be allowed in the rate base comes up for consideration.¹

Contingencies and Omissions.—In making an inventory of the property of a large utility, it is impossible to include every item of property. In some cases, portions of the distribution system

¹ New York Tel. Co. v. Prendergast, 36 F. (2d) 54, P.U.R. 1930B, 34; Southwestern Bell Tel. Co. v. San Antonio (C.C.A.), 2 F. Supp. 611 (1935), 7 P.U.R. (N.S.) 433; for lower court action see (1934), 4 P.U.R. (N.S.) 94; Re Southwestern Bell Tel. Co. (Okla. 1935), 9 P.U.R. (N.S.) 113; Re San Diego Consol. Gas & E. Co. (Cal. 1935), 7 P.U.R. (N.S.) 443; Re Chesapeake & Potomac Tel. Co. (D.C. 1935), 4 P.U.R. (N.S.) 346; Re Northern States P. Co. (N.D. 1936), 15 P.U.R. (N.S.) 125; Re Yellow Cab Co. of Philadelphia (Pa. 1937), 17 P.U.R. (N.S.) 433.

are composed of pipes or conduits buried underground in the city streets. In other cases, unavoidable omissions are made in the count of portions of the extensive equipment. The various items to be covered by such an allowance are well set forth in the following citation:

General contingent costs during construction may arise from a variety of causes, such as: (a) Changes in construction due to unforeseen obstacles developed during the progress of the work; (b) Rise in prices for material and labor above normal; (c) Financial panics; (d) Inclement weather causing delays; (e) Floods causing both an actual property loss and unavoidable delays; (f) Failures of contractors; (g) Especial unforeseen difficulties encountered in deep excavations; (h) Strikes; (i) Litigation; (j) Taxes and assessments on real estate and personal property for two years; (k) Insurance; (l) Cost of temporary drive wells and pumping plant to supply city before permanent plant is completed; (m) Cost of selling construction bonds, including commissions or discounts.—*Lincoln v. Lincoln W. & L. Co. (Ill.)*, P.U.R. 1917B, 1.

Obviously all the individual items entering into a complete inventory cannot be treated alike as to allowance, for the probability of omission is not the same for all. Some items, such as buildings and land, are large enough to warrant the conclusion that they will not be overlooked. On the other hand, small items such as bolts and other hardware, electrical switches and similar equipment, and wire and poles may require considerable allowances for items missed in the inventory. Also, the amount of labor necessary for installation may be more accurately estimated in some instances than in others. However, it may not be worth the time and effort to make certain that all items of a particular class are included, when it is known that the error cannot exceed a small amount.¹ These points are illustrated in the following citation:

The Colorado Commission made a detailed estimate of the amount to be allowed for omissions and contingencies:

¹ *Re Lafayette Tel. Co. (Ind.)*, P.U.R. 1920A, 422; *Brooklyn Borough Gas Co. v. Prendergast*, 7 F. (2d) 628, P.U.R. 1926A, 412; *Aluminum Goods Manufacturing Co. v. Laclede Gas L. Co. (Mo.)*, P.U.R. 1927B, 3; *Milwaukee E. R. & L. Co. v. Milwaukee (Wis.)*, P.U.R. 1918E, 1; *Re Union E. L. Co. (Mo. 1937)*, 1 P.U.R. (N.S.) 337.

| Plant account | Cost of reproduction | Contingencies and omissions | |
|-------------------------------|----------------------|-----------------------------|--------------|
| | | Per cent | Amount |
| Right of way..... | \$ 272,848.25 | 0 | \$ 0.00 |
| Land..... | 210,080.64 | 0 | 0.00 |
| Buildings..... | 760,821.72 | 0 | 0.00 |
| Central office equipment..... | 1,391,169.85 | 1 | 13,911.70 |
| Station apparatus..... | 633,582.24 | 1 | 6,335.82 |
| Other office equipment..... | 32,053.78 | 0 | 0.00 |
| Station installations..... | 283,960.59 | 1 | 2,839.61 |
| Interior block wires..... | 14,168.96 | 5 | 708.45 |
| Private branch exchange..... | 131,881.44 | 2 | 2,637.63 |
| Booths and spl. fittings..... | 51,561.09 | 1 | 515.61 |
| Pole lines..... | 4,020,921.74 | 4 | 160,836.87 |
| Aerial cables..... | 1,374,388.59 | 2 | 27,487.77 |
| Aerial wire..... | 2,727,937.92 | 4 | 109,117.51 |
| Underground conduit..... | 638,671.59 | 2 | 12,773.45 |
| Underground cable..... | 890,850.77 | 2 | 17,817.01 |
| Office furn. & fixtrs..... | 78,749.85 | 0 | 0.00 |
| General store equip..... | 2,923.85 | 0 | 0.00 |
| Stable & garage equip..... | 36,788.27 | 0 | 0.00 |
| Tools and implements..... | 20,851.88 | 0 | 0.00 |
| Total..... | \$13,573,315.41 | 2.62 | \$354,972.43 |

This gives a "blanket rate" of 2.62 per cent for the property. Witnesses of the telephone company claimed an allowance of 3 per cent of the cost of reproduction of all property inventories, but did not give in detail the method of arriving at that percentage.—*Re Mountain States T. & T. Co. (Colo.)*, P.U.R. 1917B, 198.

Pavement over Mains and Conduits.—Two general types of case arise in the consideration of an allowance in the rate base for a sum representing the value of pavement laid over mains or conduits. The first of these general cases is that of pavement laid by the city after the mains and conduits have been laid in the ground by the company. In such cases the utility has paid nothing for the pavement unless it has been assessed some portion of the pavement cost. The pavement will not have to be cut and relaid by the utility until such time as the mains have to be renewed or replaced by larger ones. The cost of this work would be paid for from the depreciation reserve, if the work were simply that of replacement, or partly from this reserve and the remainder

from new capital, if the main is enlarged at the time it is replaced. The cost of cutting and replacing this pavement would then be charged to new capital. In cases of this first type, the opinions of commissions and courts are unanimous that pavement over mains or conduits not laid by the company cannot be allowed for in the rate base.

The second case arises from a consideration of pavement that has to be cut and relaid by the utility on account of construction work done after the pavement has been in place for some time. The presence of the pavement and the cost of relaying it make the cost of such work more expensive to perform than where the work is done prior to laying the pavement. For this reason, the actual cost of cutting and relaying the pavement is to be allowed in such cases. Where possible, changes in mains and laying of new mains are usually made before paving the street. In some cities ordinances forbid the cutting of new pavement for 3 to 5 years after it is laid.¹

Whether the cost of paving should or should not be included in the first instance depends upon the answer desired. Is it the reproduction cost, or is it the value for rate-making purposes? The situation is similar to that of poles erected a number of years ago when poles cost much less than they do today. When an old pole is replaced with a new one of greater cost, will any person deny that the extra cost of such pole should be included in the rate base? The replacement cost in either case is greater than the original cost, the difference being that, in one case, the increase comes about because of a change in the method of replacement, whereas in the other it comes about because of higher cost of the article. It seems to the authors that the whole question is similar to that considered later under Depreciation. For many years, the base for calculation of depreciation was the original cost of the part considered. This principle was reversed in a case before the Supreme Court in *United Railways & Electric Co. v. West*, 280 U.S. 343, P.U.R. 1930A, 225, where it was decided that present value should be used. No decision of the Supreme

¹ Cedar Rapids Gas L. Co. v. Cedar Rapids, 144 Iowa 426, 120 N.W. 966, May 4, 1909; affirmed 233 U.S. 655, 56 L. ed. 594, 32 Sup. Ct. 389, Mar. 11, 1912; Ripon v. Ripon Water Co., 5 Wis. R.C.R. 10; Re Elizabeth-town Water Co., 43 F. (2d) 478, P.U.R. 1930E, 374; Re City of Fresno (Cal.), P.U.R. 1919E, 503.

Court has been found since that date which refers to pavement over mains where the pavement was laid after the mains. If present value is proper for the depreciation reserve, then pavement should be included, for it must be relaid from the depreciation reserve at the time of relaying the mains whether the pavement was originally laid by the city or by the company.¹

Favorable Location.—A value for favorable location of a public utility and for having secured certain rights that cannot be replaced without much greater expense has been advanced by some utilities for an addition to their rate bases. A utility management should be rewarded for its foresight in securing a favorable location, but such reward should be in allowing greater earnings or return on the rate base rather than in allowing a greater value. Economists may say that this, in effect, is allowing a greater valuation, and this is true if value is measured by the earnings. It may be remembered, however, that valuations of utilities cannot be determined by their earning power; rather the permitted earnings are based upon the valuation. An amount allowed in the rate base is more or less perpetual, but additional earnings may be reduced at a later date without disturbing the rate base.²

The capitalization of an item for favorable location would, in essence, be demanding a return from the public for the use of a right inherent in the public's own property. The privilege to cross the river, irrespective of the site or location, is obtained from the body politic. Moreover, it is the duty of such a utility to exercise due caution and judgment in selecting the most economical site available, consistent with public convenience; and, consequently, the argument that a premium should

¹ *Columbus Gas & Fuel Co. v. Columbus (Ohio)*, P.U.R. 1927C, 639; *Municipal Gas Co. v. City of Wichita Falls (Tex. 1935)*, 9 P.U.R. (n.s.) 33; *Kings County L. Co. v. Prendergast*, 7 F. (2d) 192, P.U.R. 1925C, 705; *Roanoke Waterworks Co. (Va.)*, P.U.R. 1920C, 745; *Re Atlanta Gas L. Co. v. Public Service Comm.*, P.U.R. 1931E, 461; *United Fuel Gas Co. v. Public Service Comm.*, 14 F. (2d) 209, P.U.R. 1927A, 708; *Dayton P. & L. Co. v. Ohio Pub. Util. Comm.*, 292 U.S. 290, 78 L. ed. 1261, 54 Sup. Ct. 647 (1934), 3 P.U.R. (n.s.) 279; *State ex rel. St. Louis v. Public Service Comm. (Mo. 1937)*, 20 P.U.R. (n.s.) 6.

² *Re Kansas City, C. C. & St. Joseph R. Co. (Mo.)*, P.U.R. 1920B, 37; *West Winfield v. Senif (N.Y. 2d Dist.)*, P.U.R. 1920C, 82; *Scranton v. Scranton Spring Brook Water Service Co. (Pa.)*, P.U.R. 1931B, 149; *Municipal Gas Co. v. Wichita Falls (Tex. 1935)*, 9 P.U.R. (n.s.) 33.

be paid by the public on the exercise of such judgment is unsound.—*Herring v. Clark's Ferry Bridge Co. (Pa.)*, P.U.R. 1926D, 514.

Appreciation in Value.—The question of an allowance in the rate base of a utility for appreciation in the property has been debated by commissions and courts since the earliest cases of utility regulation. The *Smyth v. Ames* Case and others decided by the Supreme Court of the United States call for present value of the property. In order to allow for present value on a rising cost scale of unit prices, appreciation will have to be allowed. This appreciation may be caused by the unearned increment in property values such as real estate, brought about by increase in population resulting in increases in property values in the city in which the utility is located, or of right of way of railroads for track and terminals, caused by the general prosperity of the country through which the railroad passes. The opponents of an allowance for appreciation claim that all the company is entitled to expect is the prudent investment and that other values are those that have been contributed by the public who should not be charged a percentage on that which they themselves have contributed to the utility. The reply of the utility to this argument is that the growth of the city and of the territory has been brought about by the assistance of the utility itself and that the utility should be permitted to share with other property owners in these increased values. This is particularly true of the growth of suburbs of cities and of the agricultural lands of the plains country, brought about by transportation facilities afforded by the railroads. Appreciation in land values will be discussed more fully under Valuation of Land in a later section.

That it is reasonable to allow some benefit because of an increase in price level may be demonstrated as follows: Assume that a house was constructed at a cost of \$5,000, that it has an expected life of 28 years, that a sum set aside annually for depreciation will accumulate at 4 per cent interest, and that the index of construction cost increases 5 per cent each year. If 2 per cent of \$5,000 is set aside annually and left to accumulate at 4 per cent interest, it will amount to \$5,000 at the end of 28 years. At the end of this time the construction cost is 140 per cent higher, so that, if the owner wishes to duplicate the house, it will cost him \$12,000 to do so. Suppose that he has been renting this house and has included in that rent besides interest, taxes, and other

current expenses a depreciation charge of \$100 annually. He would find himself behind by \$7,000 at the end of the 28-year period. In other words, although he received his \$5,000 back, he was deprived of \$7,000 worth of property during this time. In order to put himself in an equivalent position, he should have set aside \$240 annually instead of \$100, for then, at the end of 28 years, he would have accumulated \$12,000—just enough to erect the new house. Hence he has no more property at the end than at the beginning of that period. A smaller depreciation charge would cause him to be still worse off, except as to actual dollar value. On the other hand, if the construction cost were decreasing from year to year, he would need to charge to depreciation a lesser amount.¹

Earning Capacity.—In the case of a utility that is capable of earning a fair return on its rate base, as established by ordinary principles, the earning capacity at rates fixed by itself or by the approval of a commission or court can have no place in the consideration of value, since this would be capitalizing the earnings. However, in the case of utilities which are overbuilt or which have experienced competition from other sources of supply, such as that being met by street railways and the steam railroads, or in the case of utilities located in territory which cannot support earnings on values established by other principles, a somewhat smaller value than that resulting from ordinary methods of rate-base valuation must be fixed.²

The probable earning capacity of a public utility's property is an element or evidence of value, although the value of the use of the property alone as measured by its earning capacity cannot generally be made the criterion when the return itself is in question. In the case before the Commissioner, the return itself was not in question; it was doubtful if a reasonable return under operating conditions could be made even on the scrap value of the property.—*Re Portland E. P. Co. (Ore.)*, P.U.R. 1931E, 207.

¹ *Springfield v. Springfield Gas & E. Co.*, 291 Ill. 209, 125 N.E. 891, P.U.R. 1920C, 640; *Consolidated Gas Co. v. Newton*, 267 Fed. 231, P.U.R. 1920F, 483; *Aluminum Goods Manufacturing Co. v. Laclede Gas L. Co. (Mo.)*, P.U.R. 1927B, 4; *Milwaukee v. Wisconsin R. Comm.*, 169 Wis. 559, P.U.R. 1920B, 976.

² *Re Bluefield Waterworks & Improvement Co. (W. Va.)*, P.U.R. 1927B, 286; *Re United Traction Co. (N.Y.)*, P.U.R. 1927D, 637; *Re United Railways of St. Louis (Mo.)*, P.U.R. 1928E, 421.

CHAPTER V

SPECIAL TANGIBLE ITEMS

Land. *In General.*—Land forms one of the elements that is most easily valued by local appraisers. The value of adjacent property may be obtained either from assessments or from recent transfers of property at public or private sale. The amount of land to be valued and its location are found from the deeds and records of the utility. Some questions, however, arise concerning lands that have been given to the utility, in the form either of land grants from the public domain or of land donated to the company by the state, city, or other parties. The so-called “land multiple” applied to right of way and terminal property of railroads and allowances for appreciation of land value are matters for argument. Land leased from other owners and land leased by the utility to other divisions of the same company or to private individuals require special treatment. The riparian rights and the so-called “water-right” value will be considered in the chapter on Intangibles, for they are special values attaching to land according to the purpose for which it is employed.¹

Appreciation in Land Values.—The leading case of *Smyth v. Ames* requires present value of the property. When applied to land values, this includes appreciation in the values unless these values lead to absurd results, a condition that may be possible if the utility was formerly located on property at the edge of a

¹ Re Pacific Gas & E. Co. (Cal.), P.U.R. 1923C, 385; Re Red River P. Co. (N.D.), P.U.R. 1923E, 534; Idaho P. Co. v. Thompson, 19 F. (2d) 547, P.U.R. 1927D, 388; Re Alabama P. Co. (Fed. P.C.), P.U.R. 1932D, 345; Re Clark's Ferry Bridge Co., 291 U.S. 227, 78 L. ed. 767, 54 Sup. Ct. 427, (1934), 2 P.U.R. (n.s.) 225; Re Northwestern E. Co. (Ore. 1934), 3 P.U.R. (n.s.) 1; Re Peoples Gas & E. Co. (Mo.), P.U.R. 1923E, 127; Kings County L. Co. v. Prendergast, 7 F. (2d) 192, P.U.R. 1925C, 705; Fuhrmann v. Cataract P. & Conduit Co., 3 P.S.C. N.Y. (2d Dist.), 656 (1913); Aluminum Goods Manufacturing Co. v. Laclede Gas L. Co. (Mo.), P.U.R. 1927B, 2; Re Long Branch Sewer Co. (N.J.), P.U.R. 1931A, 467; Re Advance in Rates, Western Case, 20 I.C.C. 307.

city and later the city grew beyond the property of the utility, making this land valuable for other purposes far in excess of the value to be claimed for the location of a plant. In such cases, it is assumed that the utility, if built at present, would not be located on such valuable land, and the value given is more nearly like that which would hold for land to be chosen at present by the utility.¹ The value of land was considered by the Federal Court in the Consolidated Gas Case, which was appealed to the United States Supreme Court. Both of these decisions are cited:

"As to realty, the values assigned are those of the time of the inquiry; not cost when the land was acquired for the purpose of manufacture, and not the cost to the complainant of so much as it acquired when it organized in 1884, as a consolidation of several other gas companies. The value of the investment of any manufacturer in plant, factory, or goods, or all three, is what his possessions would sell for from a willing vendor to a willing buyer, and it can make no difference that such value is affected by the efforts of himself or others, by whim of fashion, or (what is really the same thing) by the advance of land values in the opinion of the buying public. The so-called money value of real or personal property is but a convenient short method of expressing potential usefulness, and 'investment' becomes meaningless if construed to mean what the thing invested in cost generations ago. Property whether real or personal, is only valuable when useful." *Consolidated Gas Co. v. New York*, 157 Fed. 849, Dec. 20, 1907. "And we concur with the court below in holding that the value of the property to be determined is of the time when the inquiry is made concerning the rates. If the property which legally enters into the consideration of rates, has increased in value since it was acquired, the company is entitled to such increase." *Willcox v. Consolidated Gas Co.*, 212 U.S. 19, 53 L. ed. 382, 29 Sup. Ct. 192, Jan. 4, 1919.

Railroad Right of Way.—Railroad right of way has mostly been acquired previous to the development of the territory served by the railroad. Either this land was given to the railroad by a locality to induce it to locate in a particular region, or, in the case of Western railroads, it was given by the United States Govern-

¹ *Louisville & Nashville R. Co. v. Railroad Comm. of Alabama*, 196 Fed. 800, Apr. 5, 1912; *Kings County L. Co. v. Willcox*, 155 App. Div. 603, 210 N.Y. Supp. 479, May 9, 1913; *Stockton Terminal & Eastern R. Co.*, 2 Cal. R.C.R. 777 (1913); *United States ex rel. Kansas City Southern R. Co. v. Interstate Commerce Comm.*, 252 U.S. 178, 64 L. ed. 517, 40 Sup. Ct. 187, P.U.R. 1920D, 396; *Re Kankakee Water Co. (Ill.)*, P.U.R. 1929D, 359.

ment or by the states as special grants, including alternate sections of land, in order to make contiguous, undeveloped lands more valuable for settlement. If this right of way were to be acquired at present, it would have to be secured in the particular location that is determined by surveys and connected in such a way as to make a united whole. In such cases the owner often increases the price demanded for the particular site or sues for damages to his other property on account of interference with drainage, cutting off of corners, which thus become unavailable for his uses, damage to residence property on account of the nuisance of the railroad on the adjacent property, etc. In order to care for this extra cost, many railroads have asked for an extra value, sometimes called a "land multiple." The land multiple is a factor greater than 1, by which the value of adjacent lands is multiplied to secure the so-called "railroad value" of the land used for right of way. It has been more common to apply the simple market value to the land rather than to approve the higher value by the use of multiples. In the determination of the market value, appreciation in the value of the land since it was acquired has been allowed.¹

The use of the land multiple was approved by the Federal Court in an early case of the Northern Pacific Railroad, but this was disapproved by the Supreme Court in the following citation:

"Every railroad company is compelled to pay more than the normal market value of property in sales between private parties for the irregular tracts it needs and requires for right-of-way, yards, and station grounds. We are not to lose sight of the fact that railroads must be conducted along continuous lines and that the topography of the lands through which the lines are projected has much to do with their availability for railroad purposes and that such availability enhances their value, for which the properties so available and favorably situated for the purpose have a greater value than other adjoining and adjacent properties not so conditioned." *Shepard v. Northern Pacific R. Co.*, 184 Fed. 765, Apr. 8, 1911. "As to land value, the actual investment is not controlling, and it is the present value of the property

¹ Stockton Terminal & Eastern R. Co., 2 Cal. R.C.R. 777, Apr. 30, 1913; Re Kansas City, C. C. & St. Joseph R. Co., (Mo.) P.U.R. 1920B, 37; Re Detroit United Ry. Co. (Mich.), P.U.R. 1923E, 282; Re Long Island R. Co. (N.Y. Transit), P.U.R. 1928C, 750; Report of Wisconsin Tax Commission, 1907, p. 274; Red River P. Co. v. Grand Forks (N.D. 1935), 8 P.U.R. (N.S.) 225.

and not its original cost of which the owner may not be deprived without due process of law. The increase sought for 'railway value' in these cases is an increment over all outlays of the carriers and over the values of similar lands in the vicinity. For an allowance of this character there is no warrant. The company would certainly have no grounds for complaint if it were allowed a value for these lands equal to the fair average market value for similar lands in the vicinity, without additions by the use of multipliers or otherwise, to cover hypothetical outlays." *Minnesota Rate Cases (Simpson v. Shepard)*, 230 U.S. 352, June 9, 1913.

Terminal Lands of Railroads.—The market value of adjacent lands usually fixes the value of terminal lands of railroads. No value is allowed for the peculiar and particular use to which they are being put.¹ "A rate of return of 2.5 per cent on the terminal land of the railroad taken at present value of neighboring lands is adequate for an investment of this character." *Steenerson v. Great Northern R. Co.*, 69 Minn. 353, 72 N.W. 713, Oct. 20, 1897.

Methods of Appraising Lands.

"Several methods have been used to determine the market value of lands. These methods are all based on securing the value of adjacent lands from records and from expert testimony of those familiar with this particular real estate. One of these methods may be defined as a plan or process for the systematic collection and comparison of data relating to real estate transfers for the purpose of estimating true market values. It consists of the study of the transfer of neighboring property having conditions and characteristics similar to the land whose value is to be determined, and is intended to duplicate, as nearly as possible, the 'local real estate expert,' with a view of arriving at results approximating those which would be reached by such local expert acting without bias or suggestion. Two interpretations of the sales method have been most commonly employed. In one of these the area and consideration in each case of similarly situated land is found, and the average price (per square foot, per front foot, per lot, per acre, etc.) ascertained, and this unit applied to the tract under consideration. The other application of the method introduces what, in many cases, is believed to be an additional safeguard, consisting of the use of the average assessment values of adjacent or similarly situated lands, in combination with an average ratio or percentage representing the relationship of the assessed value of transferred lands to the total consideration paid for such trans-

¹ *City of Ripon v. Ripon L. & Water Co.*, 5 Wis. R.C.R. 1, Mar. 28, 1910; *Re Metropolitan S. R. Reorganization*, 3 P.S.C. N.Y. (1st Dist.) 113, Feb. 27, 1912.

ferred lands in the district or locality under consideration, all these figures being based on the 'ground value' exclusive of the improvements thereon. Such use of assessment figures is designed to introduce, as far as may be, the results of the judicious process of the assessor who, at least in theory, serves on behalf of the public as an unbiased expert in the matter of relative valuations, and who attempts to make allowance for the particular attributes or characteristics of particular parcels of real estate in any particular location or neighborhood. In the broader and more flexible applications of the sales method, the expert adopts one or the other of the processes just mentioned, or he blends the two together in such fashion as to yield the most consistent and trustworthy results."¹

"The value of land submitted by the Commission's engineers, being based upon opinions of real estate men, were market values, and therefore, reflected the fair values of various parcels of real estate valued for rate-making purposes." *Sullivan v. Missouri E. P. Co.* (Mo. 1935), 6 P.U.R. (n.s.) 225; *Ann Arbor R. Co. v. Fellows*, 236 Fed. 387, P.U.R. 1917B, 523; *Commercial Club v. Terre Haute Waterworks Co.* (Ind.), P.U.R. 1916B, 180; *Re Great Western P. Co.* (Cal.), P.U.R. 1923C, 545; *Re Southern Indiana T. & T. Co.* (Ind.), P.U.R. 1929E, 641; *Commercial Club v. Missouri Pub. Util. Co.* (Mo.), P.U.R. 1925C, 1017; *Louisiana v. Louisiana Water Co.* (Mo.), P.U.R. 1918B, 774; *Re Capital City Water Co.* (Mo.), P.U.R. 1918D, 561; *Re Kansas City Gas Co.* (Mo.), P.U.R. 1925A, 653; *Lehighton v. Lehighton Water Supply Co.* (Pa.), P.U.R. 1930D, 198; *Re Lynchburg Traction & L. Co.* (Va.), P.U.R. 1921E, 87; *West Palm Beach v. West Palm Beach Water Co.*, P.U.R. 1930A, 177. "The United States Supreme Court sustained a finding as to land value as against a contention that there was no evidence to support it when the finding was based upon evidence of an experienced civil engineer long engaged in land appraisal work under the Interstate Commerce Commission and later practicing as consulting engineer and valuation engineer of a government bureau, in which capacity he had given testimony in a number of rate proceedings. This ruling was made despite

¹ Advance in Rates, Western Case, 20 I.C.C. 307, Feb. 22, 1911; *Shepard v. Northern Pacific R. Co.*, 184 Fed. 765, Apr. 8, 1911; *Re Michigan Tel. Co.* (Mich.), P.U.R. 1923A, 30; *Re United Railways of St. Louis* (Mo.), P.U.R. 1923D, 759; *Re Peoples Gas & E. Co.* (Mo.), P.U.R. 1923E, 127; *Kings County L. Co. v. Prendergast*, 7 F. (2d) 192, P.U.R. 1925C, 705; *American Indian Oil Co. v. City of Poteau*, 108 Okla. 215, 236 Pac. 906, P.U.R. 1926A, 236; *Re Salmon River P. & L. Co.* (Idaho), P.U.R. 1926E, 729; *Denver Union Stockyards Co. v. United States*, 57 F. (2d) 735, P.U.R. 1932C, 225; *Re Upstate Tel. Co.* (N.Y. 1936), 13 P.U.R. (n.s.) 134; *Re Northern States P. Co.* (N.D.), 1936, 15 P.U.R. (n.s.) 125; *Re Rochester & Lake Ontario Water Service Corp.* (N.Y. 1937), 18 P.U.R. (n.s.) 25.

the fact that the land valuation expert had never lived in the city where the property was located and had not previously appraised any land in that vicinity." *Denver Union Stockyard Co. v. United States*, 304, U.S. 470, 58, Sup. Ct. 990 (1938), 24 P.U.R. (N.S.) 155.

Natural-gas Wells.—The value of natural-gas wells when new depends upon the cost of drilling the wells, including the cost of such dry holes as are necessary to prove the acreage or of offsets to protect acreage. After a well has been in use for some time in a field owned by a single company, the value of the well depends upon the probable amount of gas remaining in the ground which can be taken from the well. This amount is calculated by the use of Boyle's law, which states that at a given temperature of a gas contained in a given volume the product of pressure and volume is a constant. The pressure is measured at a given time; the quantity of gas taken from the particular volume in a given interval of time is measured together with the change in pressure when no gas is flowing. The remaining volume can then be calculated by the use of this law. However, if other wells are drawing gas from the same pool or volume and the amount of gas from these is not known, then Boyle's law can no longer be used. This latter phase is covered in the following citation:

Where natural gas sands of a gas company are honeycombed with producing wells owned by other operators and the wells differ in size, Boyle's law, which expresses the relation between the pressure and volume of a gas, cannot reasonably be applied. The Commission understood that by the application of Boyle's law it was assumed that the gas was confined in a certain container or area, and that its only means or avenue of escape was through the company's wells which was not true in this case.—*Re Cumberland & Allegheny Gas Co. (W. Va.)*, P.U.R. 1928B, 20.

The question arises whether the cost of drilling dry holes should be taken as a part of the valuation. Justice seems to require that all costs of developing such property, as the field from which natural gas and oil are produced, should be considered in the valuation, particularly where these dry holes help to define the gas acreage. However, when the property is an operating concern, such costs are usually met from operating expenses rather than being charged to capital. The West Virginia Commission discusses such a case in the following citation:

It is erroneous to include such an expense in reproduction cost. Commissioner Strathers said that as the value which the Commission estimates is the value of the used and useful property of the company in the service of the public, it follows that the only property which should be included in any estimate of reproduction cost is the used and useful property. It must be remembered that in any operated plan the cost of dry holes is taken care of through operating expenses and such a cost does not go to capital account. It was said, however, that while not so advanced in this case, the Commission realized that the claim might be made that some value should be given to such dry holes because of the fact that they had had a certain use and been of some advantage to the gas company in defining its gas territory, but any such value as it might have in this respect should be, and was, included and considered as one of the elements of going concern value.—*Re United Fuel Gas Co. (W. Va.)*, P.U.R. 1925B, 705.

The matter of including the value of reserve acreage of natural-gas property in valuation hinges on the impending use of such lands in the near future.¹ This problem was discussed by the Ohio Commission in the following:

The Ohio Commission held that certain reserve acreage should not be included for the purpose of fixing rates. It was held by the company that the opposite was the "rule universally adopted by producing companies and sustained by all jurisdictions except the State of Ohio." The Commission, in rejecting this claim cited the opinion of the Supreme Court in the Columbus Case, 4 P.U.R. (N.S.) 152, where it was said that there would be no need in the computation of the rate base to include the market or book value of fields not presently in use unless the time of using them was so near that they might be said, at least by analogy, to have the quality of working capital. In the case at bar the Commission was of the opinion that the company had not shown any impending use of reserve acreage that would justify its inclusion in the rate base.—*East Ohio Gas Co. v. Cleveland (Ohio)*, 4 P.U.R. (N.S.) 433.

¹ *Landon v. Kansas Pub. Util. Comm.*, 242 Fed. 658, P.U.R. 1918A, 31; *United Fuel Gas Co. v. West Virginia Pub. Service Comm.*, 14 F. (2d) 209, P.U.R. 1927A, 707; *Re Cities Service Co. (Kan.)*, P.U.R. 1933A, 113; *Logan Gas Co. v. Public Util. Comm.*, 124 Ohio 248, P.U.R. 1930B, 246; *Re Columbus Gas & Fuel Co. (Ohio)*, P.U.R. 1933A, 337; *Mac Thwaite Oil & Gas Co. v. Ada (Okla.)*, P.U.R. 1927D, 833; *Erie v. Public Service Comm.*, 278 Pa. 512, 123 Atl. 471, P.U.R. 1924D, 89; *Grove City v. Union H. & L. Co. (Pa.)*, P.U.R. 1933E, 89; *Re United Fuel Gas Co. (W. Va.)*, P.U.R. 1918C, 193; *Wheeling v. Natural Gas Co. (W. Va.)*, P.U.R. 1933D, 1.

Working Capital.—Working capital is the amount of money and other capital tied up in the operation of the plant, which is not represented by physical property other than materials and supplies on hand. It consists of two general types, cash on hand to meet current bills before collections are made, and materials and supplies on hand. The amount of money required to meet current expenses differs among different types of utility according to the custom of rendering bills and collecting money. In the case of telephone companies, all service except that for tolls is paid in advance by the tenth to the fifteenth day of the month in which the service is rendered. For street railway service the fares are either paid when the service is rendered or in advance by the sale of tickets and passes. For electric and gas utilities, the bills are rendered each month for service furnished the previous month on the basis of meter readings; the collection is made 30 to 60 days after the service is actually rendered. For water utilities, the same practice is used as for electric and gas service, unless the service is rendered on a flat-rate basis. In some cases, collections are made once in three months for water service. On account of these differences in practice, the amount allowed for cash working capital differs among utilities of different classes.

In the case of tools and supplies on hand, the practice again differs among utilities according to the practice of the particular utility. Coal or other fuel carried on hand on account of possible unforeseen circumstances, such as strikes, floods, or storms, which may prevent delivery, is allowed up to a reasonable amount. Materials carried on hand for repairs in case of damage from sleet, storms, floods, etc., depend upon the nearness to an adequate market for such equipment or supplies and upon the type and size of the utility. All this equipment and these supplies represent capital invested by the utility for rendering service and on which no earning can be made until it is actually put into service, unless an allowance is made under the head of working capital.¹

¹ Cedar Rapids Gas L. Co. v. Cedar Rapids, 223 U.S. 655, 56 L. ed. 594, 32 Sup. Ct. 389, Mar. 11, 1912; affirming 144 Iowa 426, 120 N.W. 966, May 4, 1909; Bonbright v. Corporation Comm. of Arizona, 210 Fed. 44, Nov. 19, 1913; Kings County L. Co. v. Lewis, 110 Misc. 204, 180 N.Y. Supp. 570, P.U.R. 1920D, 145; Re Alabama P. Co. (Ala.), P.U.R. 1923B,

Property Not Used or Useful. General.—Sometimes a utility finds itself with more property on its hands than is necessary at the time to render the service. This condition may come about from any number of reasons, each peculiar to itself, not alone in the case of utilities whose business is growing, but also in the case of others as well. A utility losing business may find itself with excess property on its hands, as was the case with numerous gas companies shortly after the introduction of the higher efficiency electric lights. When two utilities are competing in a community and a merger is made, there is no longer a need for the duplication of equipment that formerly existed. A growing utility may install much larger units of generating equipment than it can use immediately, thus causing earlier installed units to become idle or to serve merely as stand-by units to be used in emergency. Lands containing water-power development possibilities may be purchased long before they are needed with the thought in mind that at some future date the development will be extremely valuable. Governmental requirements may specify certain equipment, and later, because of a change in the laws, such equipment may be no longer required.

The dividing line between necessary stand-by use and obsolescence is sometimes very fine and often hard to determine. On the assumption that power is to be transmitted over a considerable distance to a large city and that it is the only source of supply, how many independent transmission lines should be installed before one would be classed as unnecessary? Suppose

28; *Kellogg P. & Water Co. (Idaho)*, P.U.R. 1923B, 705; *Re Red River P. Co. (N.D.)*, P.U.R. 1923E, 534; *Re Peoples Gas & E. Co. (N.Y.)*, P.U.R. 1924B, 230; *Re Wisconsin Tel. Co. (Wis.)*, P.U.R. 1925D, 661; *Re Tennessee Eastern E. Co. (Tenn.)*, P.U.R. 1926E, 379; *Re United Railways of St. Louis (Mo.)*, P.U.R. 1928E, 421; *Re Great Falls Gas Co. (Mont.)*, P.U.R. 1928E, 804; *Re Potomac Edison Co. (Md.)*, P.U.R. 1933B, 6; *California Farm Bureau v. San Joaquin L. & P. Co. (Cal.)*, P.U.R. 1932D, 310; *Re Arizona Edison Co. (Ariz. 1934)*, 2 P.U.R. (n.s.) 8; *Re Muskegon Traction & L. Co. (Mich.)*, P.U.R. 1920F, 970; *Re Duluth S. R. Co. (Wis.)*, P.U.R. 1923D, 705; *Kings County L. Co. v. Prendergast*, 7 F. (2d) 192, P.U.R. 1925C, 705; *Herr v. Lancaster Suburban Water Co. (Pa. 1936)*, 14 P.U.R. (n.s.) 369; *Blytheville v. Blytheville Water Co. (Ark. 1936)*, 15 P.U.R. (n.s.) 177; *Public Service Comm. v. Ozark Util. Co. (Mo. 1937)*, 18 P.U.R. (n.s.) 408; *Public Utilities Comm. v. Duquesne L. Co. (Pa. 1937)*, 20 P.U.R. (n.s.) 1; *Re Detroit Edison Co. (Mich. 1937)*, 16 P.U.R. (n.s.) 9.

that depreciation on a generating unit has been allowed on an assumed life of 25 years. Owing to a rapid growth of the business and development in the art, another unit of larger capacity is installed and the original unit is shut down; should the first unit be removed from the rate base as property not used and useful, and, if so, how is the utility to be compensated for the remaining life on which no depreciation has been collected? These two cases will be discussed under the heads of Superseded and Obsolete Property and Stand-by Property. What is desired is aptly expressed by the following citation:

Consumers should not pay rates for property not presently concerned in the service, unless conditions exist pointing to its immediate future use or unless the property is such that it should be maintained for reasonable emergency or substitute service; and in studying these exceptions the economic factor should be carefully considered.—*Elmira Water, L. & R. Co. (N.Y. 2d Dist.)*, P.U.R. 1922D, 238.

A situation caused by the action of a governmental body is illustrated in the following: "An intake not at present used was included in the valuation because it was constructed by order of the city and then made inoperative by the city emptying sewage above the intake." *Re Manitowoc Waterworks Co.*, 7 Wis. R.C.R. 71, June 27, 1911.

Superseded and Obsolete Property.—The reasons for property becoming obsolete and being retired are discussed under Depreciation; the consideration here is the effect of obsolete property on the valuation rate base. When such property is retired, the amount of capital represented by its value less scrap value should be withdrawn from the depreciation reserve and may be applied toward the purchase of new equipment.

"Property abandoned because of the construction of other kinds of units of property in substitution of the originals and property obtained on account of changes in methods of operation to secure greater operating efficiency, should be charged to depreciation." *Re Spring Valley Water Co. (Ill.)*, P.U.R. 1920F, 139. "The rule requiring the consideration of original cost does not require the inclusion in the rate base of property which has been abandoned and is no longer used in the public service." *Georgia R. & P. Co. (Ga.)* P.U.R. 1925A, 546. "A natural gas utility is entitled to look to the consumers for a reimbursement for the remainder of the sum prudently invested in service but rendered useless before depreciation provisions equal to original

cost, where historical investment is used as a rate base." *Pacific Gas & E. Co. (Cal.)*, P.U.R. 1934A, 1 or 1 P.U.R. (N.S.) 1.

Excess Property.—Every utility should have sufficient property over and above that used during the peak period or maximum load, for stand-by service in case of accident to any of the equipment. Any considerable amount of property retained in excess of reasonable stand-by equipment is classed as excess property. Sometimes this excess comes about by consolidation of properties, each of which is capable of carrying a considerable part of the combined load. On account of diversity in loads among the combined plants, some of the equipment may then become excessive, and this excess equipment must be retired in some manner within a reasonable time unless it is of such a nature, the utility increasing its output from year to year, that the excess property may be utilized at some future date; in other words, it may be considered as property temporarily in excess. The method of retirement, when allowed, will be discussed under Expenses.¹ The following citations give some reasons for excess property existing, with the attitudes of commissions and courts:

"If a plant was built, as probably this was, for a larger area than it finds itself able to supply, or, apart from that, justice and the Constitution requires that, say, two-thirds of the contemplated number should pay a full return, the only ground for such claim is the statute taken strictly according to its letter. If the original company embarked upon a great speculation which has not turned out to be as expected, more

¹ Re Redondo Home Tel. Co. (Cal.), P.U.R. 1920E, 26; Re United R. Co. of St. Louis, (Mo.), *supra*; Chesapeake & Potomac Tel. Co. v. Commonwealth (Va.), P.U.R. 1927B, 484; Re Columbus Fuel & Gas Co., 17 F. (2d) 630, P.U.R. 1927C, 640; Re East St. Louis & Suburban Water Co. (Ill.), P.U.R. 1928A, 57; Re Cumberland & Allegheny Gas Co. (W. Va.), P.U.R. 1928B, 22; Re Bowdoin Util. Co. (Mont.), P.U.R. 1931B, 20; Re Detroit Edison Co. (Mich.), P.U.R. 1933E, 193; Re Laclede Gas L. Co., 8 F. Supp. 806 (1934), 6 P.U.R. (N.S.) 1; City of Grand Forks v. Red River P. Co. (N.D. 1936), 12 P.U.R. (N.S.) 353; Pacific T. & T. Co. v. Thomas (Ore. 1936), 13 P.U.R. (N.S.) 337; Public Service Comm. of Missouri v. St. Joseph R. L. H. & P. Co. (Mo. 1936), 14 P.U.R. (N.S.) 113; Herr v. Lancaster Suburban Water Co. (Pa. 1936), 14 P.U.R. (N.S.) 369; Re Westchester L. Co. (N.Y. 1936), 15 P.U.R. (N.S.) 299; Indianapolis Water Co. v. McCart, 89 F. (2d) 522 (1937), 18 P.U.R. (N.S.) 279; Memphis v. Southern Bell T. & T. Co. (Tenn. 1935), 6 P.U.R. (N.S.) 464; Department Pub. Service v. Grays Harbor R. & L. Co. (Wash. 1936), 12 P.U.R. (N.S.) 178; Re Upstate Tel. Corp. (N.Y. 1936), 13 P.U.R. (N.S.) 134.

modest valuations are the result to which it must make up its mind." *San Diego Land & Township Co. v. Jasper*, 189 U.S. 439, 47 L. ed. 892, 23 Sup. Ct. 571, Apr. 6, 1903. "In ascertaining the actual reproductive value the company has the right to anticipate the growth of its business and to be allowed a proper return on a plant of sufficient size for such a growth." *Des Moines Water Co. v. Des Moines*, 192 Fed. 193, Sept. 16, 1910. "Whatever may be said of the propriety of including the entire plant in a valuation based on historical cost in the light of prudent investment, the court perceives no reason for embracing unnecessary facilities in an estimate of cost of reproduction. In a new construction under present conditions it does not appear that such an extensive manufacturing plant would be established, and a finding in a district court is amply sustained that if the manufacturing facilities no longer needed had been eliminated, the fair value would have been substantially reduced." *Los Angeles Gas & E. Corp. v. California R. Comm.*, 287 U.S. 289, 77 L. ed. 1180, 53 Sup. Ct. 637, P.U.R. 1933C, 229.

"A Federal district court included in the rate base of a telephone company the value of property not actually in use but purchased by the company in the reasonable exercise of its business judgment for future needs, in which it appeared it would ultimately be employed. The Commission had excluded from the rate base a lot of land with buildings in a congested portion of the city which the company had acquired some years previous with the intention of building a branch exchange, which, however, had not yet been done. The Commission took the view that the property was not used and useful in the public service. The court, however, declared that the testimony showed that the outlay for the property was a reasonable exercise of business judgment, and that the company still intended to put the property to the use for which it was originally purchased." *Chesapeake & Potomac Tel. Co. v. West*, 7 F. (2d) 214 (1934), 3 P.U.R. (N.S.) 241.

Stand-by Property.—Property used by a utility for strictly stand-by purposes should be valued as used and useful property. However, the point at which property becomes excess rather than stand-by is not always definite. The amount of stand-by property is dependent upon the character of the service and upon the probability of interruptions in the supply. Interruptions in the supply of gas for long periods may result in hardship to many; in northern areas, where oil burners are operated by electric motors, interruption in electric service for extended periods in the winter become a serious matter; likewise, a continuous supply of water is necessary in cities for both potable and fire-protection purposes as well as for sanitation. Sufficient spare units are important

in the vital points of every system to prevent interruptions of service.

When a gas system, formerly making and distributing manufactured gas, is later supplied with natural gas, the question arises whether or not the old generating equipment, not used for mixed gas or any other purpose, should be carried as stand-by equipment. This question is usually settled from the records of the company together with a knowledge of the character of the field from which the natural gas is supplied and the contract for the supply. Every hydroelectric source of power, depending upon the runoff from a limited drainage area, requires stand-by steam-generating equipment sufficient to supply any load in excess of that capable of being supplied by the hydroelectric plants during low-water periods. In a similar manner, water for use for supply of cities or for irrigation should be of sufficient amount at the source for the requirements at all times. This may require reserve supply in wells, reservoirs, or other units of supply or storage.¹

A power company is entitled to have included in the rate base all of the property used in connection with a steam plant for the production of its current even if such production is necessarily more expensive than if generated at a hydro plant. The hydro plant, because of lack of water, is insufficient to produce all the requirements of the utility, and the company had improved and enlarged its steam plant, discontinuing the regular use of the hydro plant.—*Grand Forks v. Red River P. Co.* (N.D.D.C. 1936), 12 P.U.R. (N.S.) 353.

The displacement of the steam pumping plant of a water utility by electric pumps rendering the steam pumps useless was discussed by the Idaho Supreme Court in the following citation:

A steam pumping plant of a water utility should be excluded from the rate base, when it has been supplanted by an electric pumping plant and there is evidence to support a finding of the Commission that it is

¹ *Buffalo Gas Co. v. Buffalo*, 3 P.S.C. N.Y. (2d Dist.) 553 (1913); *Re Martinsville Gas & E. Co. (Ind.)*, P.U.R. 1923E, 57; *Re Midwest P. Co. (N.D.)*, P.U.R. 1922E, 22; *Re San Antonio Pub. Service Co. (Tex.)*, P.U.R. 1924A, 259; *Re Acquackanonk Water Co.*, 100 N.J. L. Rev. 169, 125 Atl. 33, P.U.R. 1924E, 436; *Southern Bell Tel. Co. v. South Carolina R. Comm. et al.*, 5 F. (2d) 77, P.U.R. 1926A, 6; *Re Cheyenne L. & F. Co. (Wyo.)*, P.U.R. 1930E, 114.

no longer used and useful property.—*Boise Artesian Water Co.*, 40 Idaho 690, 236 Pac. 525, P.U.R. 1926A, 195.

In commenting upon the preceding decision, it may be well to ask the question, "If a water company, using steam pumps, concludes an advantageous contract for power, so that the expense of pumping 1,000 gal is only one-half as much as formerly, why should the steam pumps be excluded?" If the steam pumps must be retired immediately after changing to electric pumps, what incentive is there for the change? Would it not be better to apply a portion of the savings in pumping expense toward the retirement of the steam pumps, there being sufficient incentive left to the utility to operate economically and at the same time benefit the water consumers by applying the remaining portion of the savings toward a reduction in the rates?¹

Property Acquired without Cost.—One form of property under this title is that of land secured from the public domain, granted to some railroads by the states and the Federal government. This has already been considered under the valuation of land. Other items of property may consist of services paid for by consumers under an earlier policy of operation, rural lines constructed by customers and deeded to and maintained by the utility, and property paid for from operating expenses on account of an improper method of accounting employed by the utility. Usually such property, unless representing too large a portion of the whole property, is allowed to be valued as a part of the rate base of the utility.²

¹ *Elizabethtown Water Co.*, 43 F. (2d) 478, P.U.R. 1930E, 374; *Denver Union Stockyards Co. v. United States*, 57 F. (2d) 735, P.U.R. 1932C, 225; *Re Chambersburg Gas Co.*, 118 Pa. Super. 196, 176 Atl. 794, P.U.R. 1933D, 317; *Re Ohio Bell Tel. Co.* (Ohio, 1934), 3 P.U.R. (N.S.) 433; *Re Edison E. Ill. Co. of Boston* (Mass. 1934), 5 P.U.R. (N.S.) 369; *Pacific T. & T. Co. v. Thomas* (Ore. 1936), 13 P.U.R. (N.S.) 337; *Re Southern Bell Tel. Co.*, 187 La. 137, 174 So. 80 (1937), 18 P.U.R. (N.S.) 1; *Re Union E. L. & P. Co.* (Mo. 1937), 17 P.U.R. (N.S.) 337; *Pennsylvania P. & L. Co. v. Pennsylvania Pub. Service Comm.*, 128 Pa. Super. 195, 193 Atl. 427, 19 P.U.R. (N.S.) 433; reversing 16 P.U.R. (N.S.) 65.

² *Hill v. Antigo Water Co.*, 3 Wis. R.C.R. 623; *Re Platte County Independent Tel. Co.* (Neb.), P.U.R. 1916D, 63; *Re Nuckolls County Independent Tel. Co.* (Neb.), P.U.R. 1921C, 588; *Tighe v. Clinton Tel. Co.*, 3 Wis. R.C.R. 117; *Ashland v. Ashland Water Co.*, 4 Wis. R.C.R. 273; *Board of Trade v. Mountain Home Tel. Co.* (N.Y. 2d Dist.), P.U.R. 1916C, 688; *Re Kansas City C. C. & St. Joseph R. Co.* 8 Mo. P.S.C. 682, P.U.R. 1920B, 37; *Re*

The right of the company to have donations included in the value of its property for rate-making purposes can hardly be questioned as a legal proposition at this time. The property belongs to the company and is used in the public service, and therefore, the company is entitled to earn a return upon it.—*Aluminum Goods Manufacturing Co. v. Laclede Gas L. Co. (Mo.)*, P.U.R. 1927B, 1.

The relation between charges for service and method of financing an extension should be pointed out here. In some instances, electric utilities have had two schedules for the service charge where long extensions have been required, as in the case of rural service. The customers were given the choice either of paying for the extension or of having it included at the expense of the utility, with the stipulation that if they did pay for it, the service charge would be less each month by one-half of 1 per cent of the cost of the extension. The payment by the customers might have been considered as the advance payment of a deficiency in the charge for service; it being the present worth of an annuity of 6 per cent annually extending over a great many years, in which case the extension might be considered as having been paid for by the company. The fact remains that if the company owns the property it is a part of its system, being used and useful, and cannot be excluded from the rate base. How it is acquired may have some bearing upon the rate for service but not upon other considerations.

It must be borne in mind that the rate base must include all property that is used and useful regardless of how the property was obtained. The method of obtaining it may influence the return that the utility is permitted to earn but not the rate base. For example, if the valuation of a property is \$1,000,000 and of this amount \$250,000 is represented by contributions (or advance payments on rate deficiencies), the interest allowed being 6 per cent annually, the total return for interest requirements should be \$45,000 instead of \$60,000. Other elements such as depre-

Southern Nebraska P. Co. (Neb.), P.U.R. 1921C, 678; Re Central Pacific R. Co. (Cal.), P.U.R. 1916B, 845; Appleton Water Works Co. v. Railroad Comm., 154 Wis. 121, 142 N.W. 476; Re Marin Municipal Water Dist. (Cal.), P.U.R. 1915C, 433; Briggs v. Peakes Island Corp. (Me.), P.U.R. 1917E, 750; Re San Gabriel Valley Water Co. (Cal.), P.U.R. 1916B, 895; Re East St. Louis R. Co. (Ill.), P.U.R. 1919D, 24; Re Bell Water Co. (Cal.), P.U.R. 1925C, 1.

ciation are not affected. It is customary practice in municipal utilities to assess the installation of water mains against the property supplied, so that no interest charges for such mains need be included in the charge for water.¹

Property Constructed from Earnings.—Where the surplus has been employed to construct part of the property of the utility, this property is valued as part of the rate base by applying the principle that a sum earned by the utility from its rates is the property of the utility. It is immaterial whether this portion of the property is paid for from this sum before it is disbursed to the stockholders and stock dividends issued or whether it is paid to the stockholders as cash dividends and then repaid to the company in the purchase of this same stock. Profits cannot be taken from the company, nor can the company be reimbursed from rates that are too low unless provision is made for such reimbursement or recovery at the time of fixing the rates. A law, recently passed in Pennsylvania, has empowered the new commission to make temporary rates pending a determination of final rates with the proviso that any loss to the utility from the temporary rates may be reimbursed in the later permanent rates. This law was declared constitutional by the Pennsylvania Court of Appeals, but this decision was reversed by the state supreme court which was in turn reversed by the Supreme Court.² The following citation covers the legality of including the property constructed from earnings:

The exclusion by the Commission for a telephone company's rate base of the value of extensions and additions paid for from the depreciation reserve was held to be clearly erroneous, especially where the Com-

¹ *Sutter-Butte Canal Co. v. R. Comm.* (Cal.), P.U.R. 1928A, 812; *Department Public Works v. Pacific County Bridge Co.* (Wash.), P.U.R. 1928D, 279; *Re Natural Gas Co. of West Virginia*, 115 W. Va. 149, 175 S.E. 339 (1934), 5 P.U.R. (N.S.) 471; *Re Conowingo P. Co.* (Md. 1935), 10 P.U.R. (N.S.) 353; *Department Pub. Service v. Grays Harbor R. & L. Co.* (Wash. 1936), 12 P.U.R. (N.S.) 178; *Lone Star Gas Co. v. City of Fort Worth* (Tex. 1937), 20 P.U.R. (N.S.) 89.

² *Brymer v. Butler Water Co.*, 179 Pa. 231, 36 Atl. 249, Jan. 4, 1897; *Kennebec Water Co. v. Waterville*, 97 Me. 185, 54 Atl. 6, Dec. 27, 1902; *Spokane v. Northern Pacific R. Co.*, 15 I.C.C. 375 (1909); *Re Okmulgee Gas & E. Co.*, 95 Okla. 213, 220 Pac. 28, P.U.R. 1924B, 249; *Public Util. Comm. v. Edison E. L. & P. Co.* (Pa. 1937), 19 P.U.R. (N.S.) 474; *restrained in Edison E. L. & P. Co. v. Driscoll* (Fed. 1937), 20 P.U.R. (N.S.) 353.

mission had also reduced the company's allowance for depreciation. Constitutional protection against confiscation does not depend on the source of the money used to purchase the property but it is enough that it is used to render the service. Profits of the past cannot be used to sustain confiscatory rates of the future.—*Illinois Bell Tel. Co. v. Moynihan*, 38 F. (2d) 77, P.U.R. 1930B, 148.

Property under Construction.—Property under construction at the time of the valuation may or may not be included in the rate base of the company. If the property is a new extension which will be put into use during the probable duration of the rates that are being determined, the value of such property will be included. If the property is to replace other units now in service and its value is not easily determined at the time of valuation, its extra value over that which it supersedes may not be included until a later date at a new valuation proceeding.¹

Leased Property.—Leased property consists of two classes, that not owned by the utility, but leased from others for its use, and that owned by the utility, all or part of which is leased to others. Property of the first class, which is used and useful to the utility and for which the lease is fair under an "arm's-length" contract, is not valued as property of the utility, the annual rental being charged to operating expenses. Property owned jointly by several branches of a utility, part of which is leased by the branch of the utility under consideration to the other branches, is valued as property of the branch in question, and the money received from the leases is credited to gross revenue of the company, if the branch in question uses the greatest portion of the property. In the case of property leased from a holding company or leased by one branch of the utility from another under the same holding company, the value of the lease will be fixed by the commission or court, for the lease is not an arm's-length contract between strangers in interest.²

¹ Re Peoples P. Co. (Ill.), P.U.R. 1920E, 710; Re New York Tel. Co. (N.Y. 2d Dist.), P.U.R. 1923B, 545; *Ohio Bell Tel. Co. v. Public Util. Comm.*, 131 Ohio St. 539, 3 N.E. (2d) 475 (1936), 15 P.U.R. (N.S.) 443.

² Re Logan Gas Co. (Ohio), P.U.R. 1929A, 232; Re Gary R. Co. (Ind.), P.U.R. 1931D, 455; *Minersville v. Minersville Water Co. (Pa.)*, P.U.R. 1926E, 147; Re Boise Water Co. (Idaho), P.U.R. 1926D, 321; *Cauffiel v. Johnston Water Co. (Pa.)*, P.U.R. 1922D, 35.

Property Located outside the State.—In the case of natural-gas transmission lines, toll lines of telephone companies, transmission lines of electric power companies, tracks of railroads crossing state lines, etc., it is impossible for one state commission to value the whole property as a rate base of a complete company. For this reason, telephone toll lines crossing state lines and property of the trunk lines of railroads as well as of oil and gas pipe lines have been placed by Congress under either the Interstate Commerce Commission or some other Federal commission in accordance with the Interstate Commerce Clause of the Constitution. It has been the custom of most state commissions to value only the property within the state and to consider the proper "gate rate" for the commodity transmitted across the state line. In the case of the Columbus Gas & Fuel Company, the Ohio Commission agreed to take the value fixed by the West Virginia Commission for the gas pipe lines within the state of West Virginia, in the manner shown in the following citation:

Findings of the West Virginia Commission as to the value of properties of a natural gas producing company selling part of its supply to an Ohio transmission company were accepted as conclusive by the Ohio Commission in determining the proportion of such value of the West Virginia property allocable as property used by the Ohio company, where both companies were under common control, although there was some difference in the valuation methods employed by the two Commissions. —*Re Columbus Gas & Fuel Co. (Ohio)*, P.U.R. 1933A, 337.

Whether or not property located outside the state should be included in the rate base depends upon the charge for the commodity made at the state line. If charges by the foreign company are fair and reasonable, such charges become an operating expense of the company receiving the service; but the determination of the reasonableness rests finally on the valuation of the foreign property. The situation is similar to that of paying rent for an office building or of buying it and not paying rent. In the former case, the rent paid is included in operating expenses, and in the latter the building is included in the rate base upon which a fair return is allowed. This difference is shown in the following citations:

"The value of telephone property both within the state and outside, used for service to customers within the state, should be considered in a

rate valuation, but in a final determination, the foreign property was excluded from the rate base and an appropriate amount added to expenses." *Re New York Tel. Co. (N.J.)*, P.U.R. 1925C, 767. "No allowance was made for electrical property except that located in a county where a public utility was rendering service, although the system was actually dependent for adequate power supply upon power sources and transmission facilities in another state." *Re Pacific P. & L. Co. (Ore.)*, P.U.R. 1931D, 113.

That there is a difference in the methods of making such allowances is seen in the following citations:

"The purpose of valuing the property of a public utility company is to aid in fixing a base on which to determine the reasonable rates and charges which the company may exact for the service it renders. Manifestly if this base is to be a just one, the value of all the property necessarily used by the utility in the performance of the service, wherever situated, must be taken into consideration in forming it. It could be possible for a company supplying electric energy to consumers in the state to have all of its generating plants located outside the state with nothing but transmission lines within it, and it would be possible that all the energy generated was used in the state. In such case it is plain that a charge for service, based alone upon the value of the transmission lines, would not be remunerative to the company. Under such circumstances no one could rightfully say that the value of the entire plant should not be taken into consideration in fixing the rate base, and this being so, it must follow that when a proportionate part of the energy used in the state is generated outside the state, a like proportion of the cost of generation must be added to the rate base." *State ex rel. Pacific P. & L. Co. v. Department Public Works (Wash.)*, P.U.R. 1927C, 781. "The value of natural gas property of a utility which operated in three states was apportioned for rate making purposes in one state, on the basis of the use made of the property by the customers of that state rather than upon the basis of the company's properties being treated as an integrated natural gas plant serving customers throughout its system." *Wheeling v. Natural Gas Co. (W. Va.)*, P.U.R. 1933D, 1. "Property of an electric utility situated outside the state, and hence not subject to the jurisdiction of the Commission, should be excluded in ascertaining the rate base." *Re Tennessee E. P. Co. (Tenn.)*, P.U.R. 1930E, 312.

Pavement between Rails of a Street Railway.—In the early days of the horsecar, the horses and mules, used as the motive power, wore out the street between and at each side of the rails

of street railways. The rails, becoming higher than the general grade of the streets, were dangerous to traffic and difficult to cross. Since the repairs to the roadway of the railway must be done by the company, it became customary for cities to pass ordinances requiring the railway to pave the portion of the street between the rails and for some distance, usually 1 ft, outside the rails. In some states this custom was supported by laws requiring this paving in all cities where street railways operated. With the passing of the horsecar and the arrival of the cable and electrically propelled vehicle, the custom was continued, although this portion of the street was no longer damaged by the railway. Such charge is in effect a franchise charge on the railway, for this paving represents property paid for by the railway but not used and useful to them. In some cities this practice has been discontinued; but where it is still in force the question arises as to whether or not this property shall be valued and, if so, on what basis. In most cases original cost of the paving has been fixed as the proper amount to be added to the rate base of the utility.¹

¹ *Philadelphia v. Philadelphia Rapid Transit Co. (Pa.)*, P.U.R. 1923E, 190.

CHAPTER VI

INTANGIBLE ITEMS OF VALUE

In General.—The items so far considered under the heads of value and rate base have been those that can be measured and counted. These are the so-called “tangible” items. Besides these elements of property there are certain intangible values attached to any business. Except in a few states, every public utility must first secure a certificate of convenience and necessity from the state in which it is to operate in order to operate within its borders. It must then obtain a special charter or a franchise covering the particular territory in which it is to locate its property. Sometimes these franchises are granted to the utility only after payment of a fee, and sometimes they are granted free of charge. They may be either for a definite term of years or they may be indeterminate as to time, but with an agreement to sell the property to the city under some predetermined method of valuation at a later date, if the city wishes to exercise its option.

Every business of a commercial nature has a so-called “good-will value” which is measured by the number of customers and the number of years the business has been operating under the same firm name and at the same location. Since a public utility is a monopoly, it can hardly be said to have a good-will value in the sense of the term as applied to a private business. The terms “going value” and “going-concern value” were adopted to cover some of the same fundamentals as are included under good will. Methods of measurement of this value have varied from mere estimates, through cost of building up the business and capitalization of losses in early years of operation, to the present method of valuing the entire business as a “going business with customers attached and with money coming in.”

Other elements of intangible value are water rights for potable water, for irrigation, or for hydroelectric development, natural gas leaseholds, favorable contracts, patent rights, and favorable words. Water rights have been measured from the mere cost

of obtaining the riparian rights of taking the water, to a capitalization of the saving in operation over a steam plant capable of performing the same work and located at the same place. With the formation of the Federal Power Commission, future developments of hydroelectric rights on navigable streams have been put under its control. This control has been extended by court decree to include streams flowing into navigable streams;* when applied, this covers nearly all the undeveloped sites in this country. The method of valuation of the water right has become established from the early decisions of this commission. These problems will be discussed in this chapter, as the final point in our consideration of the determination of the rate base.¹

Franchise Value. *Determinate Franchises.*—Early cases differed as to the measure of the value of the franchise. Where the franchise had actually cost the company something to obtain, it was allowed this value in the rate base; where no cost was attached but it had a definite term of years to run, it was given a value in purchase cases measured to some extent by the loss of earnings that would accrue to the company during the remaining years of the franchise. In rate cases, commissions and courts have differed as to its value and the method of arriving at a value. The Supreme Court allowed a value for the franchise in an early case of the Consolidated Gas Company of New York City, and this value was continued for this utility in later decisions by the commission and lower courts. In later decisions, the Supreme Court has apparently reversed its position in this case, declaring against any value above the cost to the utility.²

* Since this was written (1939) a circuit court of appeals has reversed the decision of the lower court and the Federal Power Commission.

¹ *Galena Water Co. v. Galena*, 74 Kan. 624, 87 Pac. 735, Nov. 10, 1906; *Re Arizona Edison Co.* (Ariz. 1934), 2 P.U.R. (n.s.) 8.

² *Montgomery County v. Schuylkill Bridge Co.*, 110 Pa. Super. 54, 20 Atl. 407, May 25, 1886; *Monongahela Navigation Co. v. United States*, 148 U.S. 312, 37 L. ed. 463, 13 Sup. Ct. 622, Mar. 27, 1893; *Consolidated Gas Co. v. New York*, 157 Fed. 849, Dec. 20, 1907, appealed and affirmed in *Willcox v. Consolidated Gas Co.*, 212 U.S. 19, Jan. 4, 1909; *Consolidated Gas Co. v. Newton*, 267 Fed. 231, P.U.R. 1920F, 483; *Cumberland T. & T. Co. v. Louisville*, 187 Fed. 637, Apr. 25, 1911; *Home Tel. Co. v. Carthage*, 235 Mo. 644, 139 S.W. 547, July 1, 1911; *Fuhrmann v. Buffalo Gen. Electric Co.*, 3 P.S.C. N.Y. (2d Dist.) 739, Apr. 2, 1913; *People v. O'Brien*, 111 N.Y. 1; *Brunswick & Topham Water Dist. v. Maine Water Co.*, 99 Me. 371, 59 Atl. 537; *State Railroad Tax Cases*, 92 U.S. 606; *Metropolitan*

"Franchises bought from other companies which paid nothing for them should not be valued for rate making. It was conceded that they constituted property which would survive the dissolution of the corporation possessing them, that they were property the acquisition of which would support the issue of capital stock, and that they were property which might be subject matter of a special franchise tax, but the fact remained that nothing was paid by any of the vendor companies for such franchises to the franchise granting power and, therefore, no valuation on the same could be included in the rate base. It was held that the test was not what the present corporation paid for them, nor what might be their present value, but what the vendor companies paid for them." *Brooklyn Union Gas Co. v. Prendergast*, 7 F. (2d) 638, P.U.R. 1926A, 412. *Indeterminate Franchises*.

"An indeterminate permit is a grant of authority to do business, which continues in force until such time as the power that gave it exercises an option to purchase, provided for in the grant, or until otherwise terminated by law. One of the main advantages said to result from this form of franchise is the protection of the public utility from competition, either by the municipality itself or by another public service corporation, and the consequent security against almost total loss of investment which would invariably result from scrapping the plant upon the expiration of a franchise and the failure to renew by the municipality; since the right of the company to remain in service cannot under these permits be terminated by the municipality except by the payment to the company of just compensation for all its property actually used and useful for the convenience of the public." *Re Citizens Gas Co. (Ind.)*, P.U.R. 1922B, 440.

As stated in a case before the Wisconsin Commission and affirmed by the Wisconsin Supreme Court:

Trust Co. v. Houston & T. C. R. Co., 90 Fed. 683; *Adams Express Co. v. Kentucky*, 166 U.S. 171; *Id. v. Ohio*, 166 U.S. 185; *Fargo v. Hart*, 193 U.S. 490; *Beale & Wyman on Railroad Rate Cases*, Sec. 368; *Libby v. Libby Water Co. (Mont.)*, P.U.R. 1922E, 402; *Plainfield Union Water Co. v. New Jersey*, 30 F. (2d) 846, P.U.R. 1929D, 3; *Georgia R. & P. Co. v. Georgia R. Comm.*, 262 U.S. 625, 67 L. ed. 1144, 43 Sup. Ct. 680, P.U.R. 1923D, 1; *Cedar Rapids Gas L. Co. v. Cedar Rapids*, 223 U.S. 655, 56 L. ed. 594, 32 Sup. Ct. 389; *Des Moines Gas Co. v. Des Moines*, 238 U.S. 153, 59 L. ed. 1244, 32 Sup. Ct. 389; *Galveston E. Co. v. Galveston*, 258 U.S. 388, 66 L. ed. 678, 42 Sup. Ct. 351, P.U.R. 1922D, 159; *People ex rel. Westchester S. R. Co. v. Public Service Comm.*, 158 App. Div. 251, 143 N.Y. Supp. 148, July 8, 1913; *Re Southern Pacific Co. (Ore.)*, P.U.R. 1926A, 298; *Municipal Gas Co. v. Wichita Falls (Tex. 1935)*, 9 P.U.R. (n.s.) 33.

One of the primary considerations which led to the adoption of the provisions respecting the surrender of franchises was the elimination of franchise values whenever a municipality elected to acquire the property of a public utility. As an inducement to the surrender, the right to operate until the municipality exercises its option, protection from competition either by the municipality or another public service corporation, and security against almost total loss of investment which would result from the scrapping of the plant upon the expiration of the franchise, were made available to the public utilities by means of the privilege denominated in the statute as indeterminate permit. By making a surrender of its franchise and accepting an indeterminate permit, a public utility acquired, in effect, a legally protected monopoly and the right to continue its public service indefinitely. The right to remain in the public service could not be terminated by the municipality except on payment to the company of just compensation for all its property actually used and useful for the convenience of the public. For the municipality to thus acquire the property upon the terms of the statutes did not constitute a taking of private property for public purposes against the will of the owner, for upon surrender of its franchise and acceptance in lieu thereof an indeterminate permit the utility gave its consent to the sale on the terms thereof as prescribed in the statute. Therefore, in determining just compensation for the property acquired, the expired permit or license was not an element of value entering into the calculations.—*Re Appleton Waterworks Co.* (1910), 6 Wis. R.C.R. 97, affirmed in 154 Wis. 121, 142 N.W. 476; see also *Waukesha Gas & E. Co.*, 181 Wis. 281, 194 N.W. 846, P.U.R. 1923E, 634.

Going-concern Value. *Good Will in Business.*—In an ordinary competitive business enterprise that has been in successful operation without change in name, an element of value attaches over and above that of the goods and fixtures of the store. This value is the “good will” of the enterprise, which has been defined in numerous books on accounting and business; a typical definition is the following taken from Hatfield on Modern Accounting, p. 107: “It has been said that good will, which may be taken as the typical form of immaterial assets, represents the value of business connections—the value of the probability that present customers will continue to buy in spite of the allurements of competing dealers.”

In a case before the circuit court of appeals, the following decision was given as to good will:

Where an individual or firm or a corporation has gone on for an unbroken series of years conducting a particular business, and has been so scrupulous in fulfilling every obligation, so careful in maintaining the standard of goods dealt in, so absolutely honest and fair in business dealings that customers of the concern have become convinced that their experience in the future will be as satisfactory as it has been in the past, while such customer's good respect of their own experience tends continually to bring new customers to the same concern, there has been produced an element of value quite as important—in some cases perhaps far more important—than the plant or machinery with which the business is carried on. That it is property is abundantly settled by authority, and, indeed, is not disputed.—*Washburn v. National Wall Paper Co.*, 26 C.C.A. 312, 81 Fed. 20.

This good-will value has been denied to public utilities that are monopolies, these being the only concerns that the customer can patronize to secure the particular service.¹

Definitions.—Many definitions have been devised by commissions and courts to express what is meant by “going value” or “going-concern value.” In early cases, a separate value was segregated for this purpose in the valuation. Some of the definitions were based upon the idea of good will and some on that of the cost of attaching the business. For the purpose of presentation to courts or commissions, definitions that have already been accepted and passed upon in cases before them are better than those based upon more hypothetical considerations.² Some of the accepted definitions are given in the following citations:

“By going value we understand is meant that value which arises from having an established ‘going’ business. While not the exact equivalent

¹ Re Cashton L. & P. Co. (1908), 3 Wis. R.C.R. 67; Re Lincoln Traction Co., 103 Neb. 229, 171 N.W. 192, P.U.R. 1919C, 927; Consolidated Gas Co. v. New York, *supra*; affirmed in *Willcox v. Consolidated Gas Co.*, 212 U.S. 19 (1909).

² Re Penobscot County Water Co. (Me.), P.U.R. 1923B, 781; Re Laporte Gas & E. Co. (Ind.), P.U.R. 1920F, 586; Metropolitan Trust Co. v. Houston & Texas C. R. Co., 90 Fed. 683, (1898); Illinois C. Comm. v. Chicago Tel. Co. (Ill.), P.U.R. 1924A, 215; Re Platte County Tel. Co. (Neb.), P.U.R. 1922D, 303; Re City of Lapeer (Mich.), P.U.R. 1923B, 740; Re Southern Nebraska P. Co. (Neb.), P.U.R. 1921C, 678; *Pacific T. & T. Co. v. Whitcomb*, 12F. (2d) 279, P.U.R. 1926D, 816.

of 'good will,' as applied to ordinary business, it is of somewhat similar nature, and attaches to the business, rather than to the property employed in such business." *Cedar Rapids Water Co. v. Cedar Rapids*, 118 Iowa 234, 91 N.W. 1081. "Going concern value is an expression of the added value of the plant as a whole over the sum of the values of its component parts which is attached to it because it is in active and successful operation and earning a return." *Knoxville v. Knoxville Water Co.*, 212 U.S. 1. "Going concern is an element of value over and above the value of the structural elements which inheres in a property which has an established business and is a going concern, and represents the difference in value between the dead structural property fully completed but not in operation, and the same property financed, organized, successfully operating, with customers attached, and with revenues coming in." *Fort Wayne v. Home T. & T. Co. (Ind.)*, P.U.R. 1920D, 83. "Going value is the difference between what a prospective customer would pay for a fully equipped and completed plant ready to operate, but which in fact had never been operated, and one fully completed and equipped which is actually operating with an established business as a going concern." *Re New York & Richmond Gas Co.*, 10 F. (2d) 167, P.U.R. 1925E, 19. "A value attaches to a going concern that is not existent when the 'bare bones' of the property are alone considered, and there should be included in the value of the utility property a reasonable allowance for going concern value." *Re City of Marysville (Cal.)*, P.U.R. 1927C, 195.

Consideration in Early Cases.—In many of the early cases, the commissions and courts were confused as to the definitions of going value. They sometimes made a nominal allowance, and at others a percentage allowance was made based upon some reasoning not clearly stated in the case. In *Consolidated Gas Co. v. Mayer*, 157 Fed. 849 (1907), appealed to the Supreme Court in *Willcox v. Consolidated Gas Co.*, 212 U.S. 19, Jan. 4, 1909, the lower court allowed good-will or going-concern value, being confused about the difference between these two terms, but the Supreme Court apparently rejected this value. In *Knoxville v. Knoxville Water Co.*, 212 U.S. 1, Jan. 4, 1909, the court allowed the addition of going-concern value by the lower court without deciding on its justice. In *Cedar Rapids Gas Light Co. v. Cedar Rapids*, 144 Iowa 426 (1909), 223 U.S. 655, the lower courts were not clear in their definitions, and the Supreme Court sustained the lower court in ruling out going value. In *C. H. Venner v. Urbana Water Co.*, 174 Fed. 348 (1909), about 14 per cent of the

total value was allowed for going value. In *Missouri, Kansas & Texas R. Co. v. Love*, 177 Fed. 493 (1910), the theory of going-concern value was applied. In *Des Moines Water Co. v. Des Moines* (1910), about 10 per cent allowance was made. In *Spring Valley Waterworks v. San Francisco*, 124 Fed. 574 (1903), 165 Fed. 667 (1908), 192 Fed. 137 (1911), a value was allowed in the two earlier decisions but none was allowed in the final decision. In *Cumberland T. & T. Co. v. City of Louisville*, 187 Fed. 637, Apr. 25, 1911, the court held that, if cost of reproduction less depreciation is used, this virtually gives the going-concern value. In *Pioneer T. & T. Co. v. Westenhaver*, 28 Okla. 429, 118 Pac. 354, Jan. 10, 1911, 20 per cent of the reproduction cost was allowed for "establishing the business."¹

Cost of Establishing the Business.—One method used by regulating bodies for the determination of going value is that of using the cost of attaching the business, otherwise known as development costs. The Ohio Joint Committee laid down some of the elements of this method in the following citation:

Some of the elements of expense which enter into the cost of reproducing the business are as follows: (1) The cost of organizing and training the office force, and all employees whose work requires skill peculiar to the business of the utility, dispatchers, roadmen, signal operators, meter readers, installers, linemen, troublemen, repairmen; (2) The cost of organizing the clerical force; (3) The cost of organizing and training the selling force; (4) The cost of securing new customers, including expenses of solicitors, advertising, printing, free wiring, or other inducements; (5) The cost of commercial engineering; (6) The cost of printing all forms, records, books, schedules, and directories; (7) The rent of commercial offices, where not owned; (8) Any other cost not included above, necessary to the development of the business found to exist on the date of the inventory.—Report of Ohio Joint Committee, 3 P.S.R. 649.

¹ Re Public Service Gas Co., 1 N.J. P.U.C. 433, (1912), sustained in *Public Service Gas Co. v. Board of Pub. Util. Comm'rs*, 84 N.J. L. Rev. 463, 87 Atl. 651; affirmed 87 N.J. L. Rev. 581, 92 Atl. 534, 95 Atl. 1079; citing *Omaha v. Omaha Water Co.*, 212 U.S. 180; *Appleton Waterworks Co. v. Wisconsin R. Comm.*, 154 Wis. 121, 142 N.W. 476, May 31, 1913; Re *Westchester S. R. Co.*, 158 App. Div. 251, 243 N.Y. Supp. 148; Re *Columbus Gas L. Co. (Ind.)*, P.U.R. 1920F, 606; Re *United Fuel Gas Co. (W. Va.)*, P.U.R. 1925B, 705; *Pioneer T. & T. Co. v. State*, 64 Okla. 304, 167 Pac. 995, P.U.R. 1918C, 138.

The elements of this cost were covered by the Oregon Commission in the following:

In determining the proper allowance for development cost, consideration should be given to the history of the utility's physical plant, and its rates, results of operation, operating organization, and attached business; the nature and size of the property served, growth of population, and kind, number, and general circumstances of its patrons; the general commercial conditions during the life of the plant, and during the ownership of the present investors; and the terms and conditions under which transfer of ownership has occurred; the financial history of the plant; the progress of the art, and general attitude of the public toward its product; the competitive conditions, if any, and all matters which in the particular instance may have a bearing on the subject.—*Re Portland R. L. & P. Co. (Ore.)*, P.U.R. 1917D, 962.

A more recent decision by a state commission follows:¹

While there may be some doubt whether a lag in ability to collect tariff charges for physically attached business is equivalent in the law to lag in attaching business, such going value will not in any event have been developed until this cost of attaching business has been undergone and the paying business attached so as to develop the value for which the allowance is to be made. This value has not as yet been developed, and no allowance can be made now, based only on the hope of the future.—*Kowalski v. Mocanaqua Water Co. (Pa. 1935)*, 5 P.U.R. (N.S.) 249.

Comparative Plant Method.—One method of determining the value of a utility as a going concern is that known as the "comparative plant method." In this determination it is assumed that a hypothetical plant is built in the same locality with no customers attached and no organization effected to carry on the business of the concern and that a reasonable number of years is allowed in which the utility is to build up its business to an

¹ *Re Chesapeake & Potomac Tel. Co. (Va.)*, P.U.R. 1920F, 49; *Re Alabama P. Co. (Ala.)*, P.U.R. 1923B, 28; *Re Philadelphia Rapid Transit Co. (Pa.)*, P.U.R. 1923E, 190; *Brooklyn Borough Gas Co. v. Prendergast*, 7 F. (2d) 638, P.U.R. 1926A, 412; *Re Union E. Co. (Mont.)*, P.U.R. 1928E, 396; *Re Marin Municipal Water Dist. (Cal.)*, P.U.R. 1915C, 433; *San Francisco v. Pacific Gas & E. Co. (Cal.)*, P.U.R. 1918A, 506; *Re San Joaquin L. & P. Corp. (Cal.)*, P.U.R. 1917C, 982; *Plainfield-Union Water Co. v. Public Util. Comm'rs*, 6 N.J. Misc. R. 267, 140 Atl. 785, P.U.R. 1928C, 657; *Re Portland E. P. Co. (Ore.)*, P.U.R. 1930D, 357; *Re Northern States P. Co. (N.D.)*, 1936, 15 P.U.R. (N.S.) 126.

operating point comparable with that of the company being valued. Hypothetical income and operating expense items are set up from the history of the plant, and unit prices for labor and materials are assumed as used in the actual operation; a fair return is allowed but assumed not to be earned at first. The cost of the entire plant with business attached is then found at the end of this term of years and is taken as the value of the utility as a going concern. This method was rejected by the Illinois Commission in the following case:

Tersely stated, the reproduction method of deriving going value is to conceive that a new utility, the exact counterpart of the existing utility, is started onward in its operating career upon the date of valuation. The process contemplates that, from some unknown cause, the existing plant is completely obliterated—nonexistent, as it were. It then becomes necessary to imagine, if one can, that the environments for utility service exist practically as before. The method furthermore assumes that, at some future date, the earlier deficits will be overcome by surpluses—the reverse of which seems to be true in an expert's computation of the deficit and surplus theory. Once the imagination is fully in play upon this reproduction method of seeking going value, it is then conjectured, "how much it will cost this new operation to reproduce and develop the existing utility's business." The answers are as numerous as the individual opinions of the many expert appraisers.—*Re Springfield Gas & E. Co. (Ill.)*, P.U.R. 1916C, 281.

This method was described by Edward Metcalf as follows:

It may be defined as the cost of establishing, up to the level of the net income of the old plant at the date of taking, the similar business of a new plant (but not of a more perfect system which the city might build), which is supposed to begin operation upon the date of the taking, the old plant going out of business at the same moment. Or, to put the same thing in another way, it is the measure of the greater value (at the time of taking) of an old, established plant, over a similar new plant completed and ready for operation on the date of taking. Or, to put the same thing in still another way, it is the measure of the cost of developing the business of the new plant to a point coincident with the net income, upon the date of taking of the old plant. Hence, the going concern or established business element of value—subject to the fairness of the rates and the character of the service—depends directly upon the net income or earning capacity of the works at the time of the taking, and there does not appear to be justification for including in this value, as some experts in waterworks valuation have done, consideration of the

increment in net annual income in the period of years after the date of taking, during which the business is being established. The latter (increment) clearly pertains to franchise, and not to going concern value.—*Re Cashton L. & P. Co.* (1908), 3 Wis. R.C.R. 67. NOTE: For an application of this method see also *Green Bay Ass'n* (1913), 11 Wis. R.C.R. 236.¹

Early-deficit Method.—In order to develop a method for the determination of going value that could be used for the measurement of this quantity as applied to any utility, the Wisconsin Commission adopted the method of capitalizing losses during the early years of operation. It is difficult to establish rates during the building up of the business which will bring in a return large enough to pay all operating expenses and a fair return on the investment. After the utility has been in operation for a long enough time to attach the proper number of customers, the losses may be overtaken by the earnings. However, in order to lower the rates so as to bring in more business, the company sometimes has to forego reimbursement for these early losses. The "Wisconsin method," so-called, determines these losses from the books of the company, wherever possible, and capitalizes these losses under the head of going value.

In the early cases, the period of development was extended during the life history of the company, but, since this rewarded inefficient management rather than good operation, the period of development was set at 4 to 6 years in the later cases. This method was adopted by some other state commissions and criticized by still others. It continued to be used by the Wisconsin Commission until after the decision of the Supreme Court in the *Galveston Electric Case*. It is no longer used by any court or commission. For discussion and application of this method, see the cases before the Wisconsin Commission previous to 1923.² The decision that declared this method illegal follows:

¹ *Greensburg v. Westmoreland Water Co.* (Pa.), P.U.R. 1917D, 478; *State Journal Printing Co. v. Madison Gas & E. Co.* (1910), 4 Wis. R.C.R. 501.

² *Landon v. Pub. Util. Comm.*, 242 Fed. 658, P.U.R. 1918A, 31; *New York Interurban Water Co. v. Mt. Vernon*, 110 Misc. 281, 180 N.Y. Supp. 304, P.U.R. 1920D, 515; *Re Michigan Tel. Co.* (Mich.), P.U.R. 1923A, 30; *Georgia R. & P. Co. v. Georgia R. Comm.*, 262 U.S. 625, 43 Sup. Ct. 680, P.U.R. 1923D, 1; *Re Pacific Gas & E. Co.* (Cal.), P.U.R. 1923C, 285; *Re Red River P. Co.* (N.D.), P.U.R. 1923E, 534; *Holland v. McGuire* (Mich.),

"A public utility cannot erect out of past deficits a legal base for holding confiscatory for the future, rates which would, on the basis of present reproduction value, otherwise become confiscatory." *Galveston E. Co. v. Galveston*, 258 U.S. 388, P.U.R. 1922D, 159.

Later Cases.—It appears that there is some intangible element of value that may be classed as going-concern value, something that must be considered as an element in determining the rate base of a utility. There seems to be a similar confusion in considering this value as there is in considering extensions paid for by customers. If the utility was fortunate enough to pay all its expenses from the start, including a reasonable return to the investor, and was able, at the same time, to include in these expenses an item for solicitation of additional business, the development of the concern to its present proportions was paid for by the customers. If, however, the value of the service was such that the rates charged from the beginning brought in insufficient revenue to permit the solicitation of new business, the expense of securing it must have been paid for by the owners of the property and they should be correspondingly compensated. In other words, whatever amounts were spent in the solicitation of new business did not go to stockholders as dividends, regardless of whether the dividends were excessive or meager. This viewpoint leads one to the conclusion that, if an additional amount is allowed for going-concern value, the earnings permitted on such value should be determined by whether or not it was paid for by the consumers or by the stockholders.

Instead of allowing a separate item for going value, the practice in most of the latest cases before commissions as well as courts has been to make a proper allowance in the unit prices and in the inventory to care for the property as a going concern. The rate base, under this form of valuation, will have very little in the form of intangible value as such.¹ Two citations from decisions

P.U.R. 1920B, 148; *Re Roundup Coal Mining Co. (Mont.)*, P.U.R. 1916D, 393; *Exeter Water Co. (N.H.)*, P.U.R. 1923B, 339; *Re Springfield Gas & E. Co. (Ill.)*, P.U.R. 1916C, 281.

¹ *Re Lafayette Tel. Co. (Ind.)*, P.U.R. 1920A, 422; *Mullendore Gas Co. v. Stillwater*, 120 Okla. 140, 250 Pac. 895, P.U.R. 1927C, 50; *Columbus Gas & Fuel Co. v. Columbus*, 17 F. (2d) 630, P.U.R. 1927C, 639; *Illinois Bell Tel. Co. v. Moynihan et al.*, 39 F. (2d) 77, P.U.R. 1930B, 150; *Re Ohio*

of the United States Supreme Court give approval to this method as follows:

"The failure of a State Commission to make a specific and separate allowance for going concern value in fixing a rate base for a gas utility does not justify an attack upon the rate base so fixed, where there is no evidence in the record of any greater difference between the total rate base allowed and the combined amounts specifically assigned to the various units of the property value; and the fact that such residual allowance is not described as going value is unimportant where the total rate base is in fact large enough to embrace that element." *Los Angeles Gas & E. Corp.*, 289 U.S. 287, 77 L. ed. 1180, 53 Sup. Ct. 637, P.U.R. 1933C, 229. "There is no necessity for a specific and independent allowance for going concern value, where the property of a utility as a whole has been valued as a going concern." *Columbus Gas & Fuel Co.*, 292 U.S. 398, 78 L. ed. 1327, 54 Sup. Ct. 763, 91 A.L.R. 1403 (1934), 4 P.U.R. (N.S.) 154.

Water Rights. *Water Supply for Cities.*—The question of the value of water rights, as separated from the value of water-bearing lands, arises in cases involving water supply for cities, water for irrigation purposes, and water for hydroelectric use. The availability of water for drinking purposes and sanitation is a necessity for human habitation of any particular locality. Cities have been put to great expense and have gone long distances to bring potable water for the use of their inhabitants. With the growth of the city or with the growth of other cities in the immediate vicinity, these supplies of water often become polluted, and the city is forced either to seek other sources of water or to put in expensive treating plants to rid the available supply from dangerous bacteria and from hardness caused by excessive mineral content.

Riparian rights have long been recognized as having value in law. The question arises, however, whether the value lies in the

Bell Tel. Co. (Ohio, 1934), 2 P.U.R. (N.S.) 113; *Re Chesapeake & Potomac Tel. Co. (D.C. 1934)*, 4 P.U.R. (N.S.) 346; *Re Montana P. Co. (Mont. 1935)*, 10 P.U.R. (N.S.) 293; *City of Torrington v. Torrington E. L. Co. (Conn. 1936)*, 13 P.U.R. (N.S.) 24; *Re Wisconsin Tel. Co. (Wis. 1936)*, 13 P.U.R. (N.S.) 224; *Pacific T. & T. Co. v. Thomas (Ore. 1936)*, 13 P.U.R. (N.S.) 337; *California Water & Tel. Co. v. California R. Comm., 19 F. Supp. 11 (1937)*, 18 P.U.R. (N.S.) 405; *Yonkers R. Co. v. Maltbie*, 296 N.Y. Supp. 411 (1937), 19 P.U.R. (N.S.) 348; *Southwestern Bell Tel. Co. v. State*, 181 Okla. 246 (1937), 19 P.U.R. (N.S.) 391.

land with its water rights or whether the water rights are to be taken as a separate value. Courts have differed in their treatment of this subject. In an early case, in connection with the water supply for San Francisco (*Spring Valley Waterworks v. San Francisco*), it was said that the value of the water rights was to be measured by the cost of securing the next most available source of supply. Since that decision, San Francisco has had to go to a considerable distance for its supply of water and to spend many millions of dollars for the development of this supply. Every large city in the country has had to face a similar experience, either in developing or in protecting its supply to keep pace with its growth. Some states have passed acts forbidding the valuation of water rights as separate from land value.¹ This is covered in a citation from the case of the Portland Electric Power Company of Oregon, giving a Supreme Court Case, which will be discussed further in the next section:

The law of the State of Oregon declares that title to waters of lakes and running streams of the state is property of the state. The question arises as to whether this prevents an allowance for a water-right value for a public utility. The Commission rules that the utility could not justly claim any water-right value under these circumstances. However, this argument overlooks the fact that the respondents' claim of value is not based upon any alleged ownership of the water itself, but merely upon the ownership of vested riparian rights, acquired prior to March 3, 1877, giving an exclusive right to the use of water. For example, the water rights at Oregon City were acquired with riparian lands through government patent issued in 1850. The nature of the claim of value will be better illustrated by stating that no claim whatever is made for any water-right value at station P, a project constructed under the Federal Power Act, of government-owned lands where no riparian rights are involved. The water-right values claimed apply

¹ Aluminum Goods Co. of America v. Laclede Gas L. Co. (Mo.), P.U.R. 1927B, 2; Re City of Marysville (Cal.), P.U.R. 1927C, 195; Residents v. Plattsburg Gas & E. Co. (N.Y.), P.U.R. 1927B, 769; Sharp v. Newville Water Co. (Pa.), P.U.R. 1929D, 618; Re Elizabethtown Water Co., 43 F. (2d) 478, P.U.R. 1930E, 374; Re Alexandria Water Co. (Va.), P.U.R. 1932C, 342; McCordle v. Indianapolis Water Co., 272 U.S. 400; 71 L. ed. 154, 47 Sup. Ct. 144, P.U.R. 1927A, 15; Re Capitol Water Co. (Idaho), P.U.R. 1928C, 473; Re Scranton-Spring Brook Water Supply Co. (Pa.), P.U.R. 1931B, 149; Indianapolis Water Co. v. McCart, 13 F. Supp. 110 (1936), 12 P.U.R. (n.s.) 478.

only in connection to rights acquired prior to the Desert Land Act of March 3, 1877. The company seems to have the support of the law with respect to this claim. The United States Supreme Court established this principle in the case of *San Joaquin & Kern River Canal & Irrigation Co. v. Stanislaus County* (1914) 223 U.S. 454, 58 L. Ed. 1041, 34 S. Ct. 652, and later affirmed in their decision in the *Indianapolis Water Co. Case* (1936) 272 U.S. 400, 71 L. Ed. 154, 47 S. Ct. 144, P.U.R. 1927A, 15, wherein it is stated clearly that water rights, if any exist, must be valued in rate making cases. These decisions and other more recent ones convince us that the recognition of water-right values was justified.—*Re Portland E. P. Co. (Ore.)*, P.U.R. 1930D, 370.

A few other commission and court decisions are also cited:

"The applicant, to fulfill the obligation of its franchise, was bound to obtain a supply of water from some source. The only source of its supply was these springs and the Bluestone River. The City of Bluefield, whose inhabitants it serves, was doubtless located in reference to these sources of water supply, and it, and not the utility company employing them, was entitled to the benefits of their relative location." *Bluefield Waterworks and Improvement Co. v. Public Service Comm.*, 89 W. Va. 736, 110 S.E. 205, P.U.R. 1922C, 79. "A water company cannot claim all the benefit from the presence of a river which is a natural advantage belonging to all the citizens, but the company is entitled to share in the benefits because of its foresight, ingenuity, and initiative in converting the stream into an immense asset both to itself and to the public by a system of machinery, dams, gates, canals, and other structures." *Re Indianapolis Water Co. (Ind.)*, P.U.R. 1923D, 449. "My opinion is that when you buy land that is riparian or otherwise water-bearing, the price which you pay for the land itself as much covers the water as the timber or anything else attached to the realty. This is well known and recognized everywhere, in that land with water has an enhanced value over lands without water. There is without a doubt a value in watershed lands, a value in riparian rights, and a value in the right of appropriation, and there is a definite distinction between these several elements. However, it does not appear necessary in this proceeding involving rates to determine definitely the value of these water rights." *Re San Jose Waterworks Co. (Cal.)*, P.U.R. 1925C, 370.

Water for Irrigation.—Water for irrigation forms the next necessity after that for drinking purposes and sanitation.¹ The

¹ *Re Capital Water Co. (Idaho)*, P.U.R. 1924D, 292; *Re California Water Service Co. (Cal.)*, P.U.R. 1928D, 209.

value of such water rights is covered in the San Joaquin & Kern River Case, cited below:

It is not disputed that the plaintiff has a right as against riparian proprietors to withdraw water that it distributes through its canals. Whether the right was paid for as the plaintiff says, or not, it has been confirmed by prescription and is now beyond attack. It is not disputed either that if the plaintiff were the owner of riparian lands to which water was distributed it would have a property in the water that could not be taken without compensation. But it is said that as the plaintiff appropriates this water to distribution and sale it, therefore, dedicates it to the public use under California Law, and so loses its private right in the case. It appears to us that when the cases cited for this proposition are pressed to the conclusion reached in the present case, they are misapplied. No doubt it is true that such an appropriation and the use of the water entitles those within reach of it to demand the use of a reasonable share of payment. It well may be true that if the waters were taken for a superior use of eminent domain, those whose lands were irrigated would be compensated for this loss. But even if the rate to be paid is not to be determined as upon the purchase of water from the plaintiff, still, at the lowest, the plaintiff has the sole right to furnish this water, the owner of the irrigated lands cannot get it except through the plaintiff's help, and it would be unjust not to take that fact into account in fixing the rates.—*San Joaquin & Kern River Canal & Irrigating Co. v. Stanislaus County*, 233 U.S. 454, 58 L. ed. 1041, 34 Sup. Ct. 652, reversing 191 Fed. 879.

Water for Hydroelectric Use.—The valuation of water rights for hydroelectric use has caused considerable controversy among different regulatory bodies. Two general methods have been used. The first of these methods values the water rights either as merely what such rights have cost or at a nominal value above this to encourage development of such sources. In the older developed country in the eastern part of the United States, the original deed for the land considered only the value of the lands plus any riparian rights attached thereto. Small power developments were made for milling purposes and for driving the machinery of manufacturing plants. Later, these older developments either fell into disuse or were purchased and combined with larger developments. The original cost of these sites has been obscured by numerous transactions, so that it is hard to determine the value. On the other hand, developments in the western part of the country have all been made on what was

formerly state or federally owned land. Water rights on these lands have been obtained for a nominal sum, and, from the start, development has been encouraged for hydroelectric use. These sites being distant from centers of population and from convenient transportation systems, it is necessary to transmit the power from them for long distances. Fuel costs are also relatively low in the eastern parts of the country, whereas they are high in the western areas. These facts coupled with other economic considerations have led to two entirely different methods of valuation. In the eastern states the almost universal practice grew up of valuing water rights as the capitalized saving of water over the use of coal or other available fuel in a modern steam plant. In the western states the practice is to value water rights at cost or nominal value.¹

In presenting the second of these methods first, *i.e.*, cost or nominal value, the following citations will show the attitude of these commissions:

It will be seen that the use of hydroelectric power results in a great saving over coal. It is upon this basis that the respondent company claimed a value for their water rights. If the reasoning of the utility be correct with reference to the great saving they have made by the use of hydroelectric power, it must necessarily follow that the cost to the consumer of the output of the hydroelectric plant should be less than the output of a steam plant dependent upon coal as the source of its power. Electric energy is generated by the same process throughout the country. It is the result of the application of power. The source of the power is usually coal or water. After a hydroelectric plant is once installed, the cost of operating the plant is comparatively small. The cost of operating does not materially increase with the size of the plant. The State of Washington, and particularly the territory supplied by the respondent company, has a very large percentage of the water power of the country, and such natural advantage should result in very low rates as compared with countries lacking the natural advan-

¹ Re Big Falls P. Co. (Wis.), P.U.R. 1918D, 234; Re Morton E. Co. (Wash.), P.U.R. 1928D, 811; Re Tennessee Eastern E. Co. (Tenn.), P.U.R. 1928D, 722; Re Douglas County L. & Water Co. (Ore.), P.U.R. 1920E, 667; Re Winnipeg E. R. Co. (Manitoba), P.U.R. 1920F, 879; Re San Joaquin L. & P. Co. (Cal.), P.U.R. 1922D, 595; Re Utah P. & L. Co., P.U.R. 1923B, 9; Re Pacific Gas & E. Co. (Cal.), P.U.R. 1923C, 385; Re Western States Gas & E. Co. (Cal.), P.U.R. 1924D, 681; Re Salmon River P. Co. (Idaho), P.U.R. 1926E, 729.

tages of the State of Washington.—*Public Service Comm. v. Pacific P. & L. Co. (Wash.)*, P.U.R. 1916B, 86.

In the consideration of the valuation of water rights by capitalizing the savings of such a plant over the use of coal in a modern steam plant, several assumptions are required on which to predicate the calculation. (1) The location of the steam plant in relation to the coal mines is considered; condensing water must be available for the modern high-efficiency steam-turbine plant with all heat-saving appliances. (2) The steam plant must be such as will supply the same load as does the water-power plant. In many cases, steam plants are used for stand-by purposes on the system; in fact, every hydroelectric installation, depending upon runoff and storage of water in reservoirs, must also have one or more steam plants on the system to take the load that cannot be supplied by the hydroelectric plant during low-water periods and, in addition, for spare capacity in case of failure of the hydroelectric source. The hydraulic plant may be used for the base load of the system, and the steam plant may take the peak loads; or if sufficient water-storage capacity is available and the stream flow may be manipulated, the reverse may be the better operation. For the calculation, however, the hypothetical steam plant must be assumed to supply the same total demand and total annual energy output as the hydroelectric plant. This requires assumptions as to the fuel required by the steam plant under these hypothetical conditions of load. Next, the interest rate must be assumed for the calculation of the capitalized value. Finally, the cost of coal at the plant must be assumed, covering the operation of the steam plant over a long term of years coincident with the operation of the project. Variation of any one or more of these items from year to year will alter the result. Recently, steam-turbine plants have been increased materially in efficiency by the installation of newer types of steam generator, operation at higher pressures and higher temperatures, and addition of more modern heat-saving auxiliaries. Predicating the use of such an installation will alter the result. Also, the result will be different at each period of valuation, since any of these variables may be changed, making the final result either higher or lower than at the last previous valuation.

Proponents of this system of valuation realize also that it takes away from the public any benefits to itself of cheap natural

resources of water power. With the introduction of electrical generation and transmission, distant water powers were made available even where they were remote from other natural resources and railroad transportation, having the effect of moving these resources nearer to the already established centers of population. Most of the commissions approving this method of valuation have given only a portion of the capitalized value to the utility, reserving the remainder for the public. Recent decisions of the Federal Power Commission covering installations under its jurisdiction have made no allowance for this value, even for installations that had been given such values by state commissions in previous decisions. This fact should be noted especially in the Alabama Power Case. In the Wisconsin Dam Site Cases the commission discusses its attitude toward valuation of water rights as follows:

It was held that among other factors affecting the value of undeveloped water power are: (1) Cost of development; (2) Normal flow of stream; (3) Constancy of flow; (4) Head of water obtained; (5) Degree of constancy of power; (6) Availability of market for current produced; (7) Availability of power for manufacturing purposes at the dam site; (8) Nature of manufacturing for which available either at the dam site or elsewhere; (9) Investment in subsidiary steam plant; (10) Availability of cheap coal for competitive production; (11) and the possibility of pondage. In ascertaining the present value of undeveloped water power under Wisconsin statutes requiring a valuation prior to the grant of a dam permit, consideration was given to: (1) Market value under assumed competitive conditions, as reflected by sales of other power; (2) The cost of development; (3) Probable earnings, without capitalizing the result of enterprise; (4) To the probable rental value as compared to similar values of other raw and developed water powers; (5) To the savings in the use of water over steam. Flowage rights should be given a value according to their use to develop water power in addition to the value of the land alone.—*Re Wisconsin-Minnesota L. & P. Co. (Wis.)*, P.U.R. 1916D, 812.

Typical of the use of capitalizing the savings over the use of a steam plant is the decision of the Virginia Commission:

Practical unanimity appears in the opinion of regulatory bodies with reference to the fair value of water rights. The investors are entitled to a return upon their foresight and their enterprise in acquiring and developing hydroelectric resources, and this return should not be limited

to the original cost, but the capitalized savings should be taken into account. Otherwise, there would be no incentive for the exercise of initiative and vision, and potential water powers would remain undeveloped. On the other hand, the public must be permitted to profit favorably in rates resulting in the existence of available water. Otherwise the public would not share in the benefits reasonably to be expected from proximate location to potential power. We repeat, there seems to be little or no difference of opinion that the above is the correct conclusion—that the investor and the public should both share in the savings effected by the use of hydroelectric development.—*Re Virginia R. & P. Co. (Va.)*, P.U.R. 1922D, 352.

The Alabama Power Company came before the Alabama Commission in 1923 for a determination of a rate base including the value of its water rights. In 1932, the Federal Power Commission made a ruling for this same company.¹ Citations from both decisions follow, since they differ concerning this value:

“Water power should not be valued by determining the original cost of the water power site since it is the power and not the site which is to be valued and it is beyond the province of the Commission to explore into the future to determine what water power sites are going to be developed and what the power resulting therefrom will be worth if such sites are developed. Developed water should be valued at an amount equal to the capitalized savings by the use of water instead of steam power generated in the most efficient manner possible. The capitalized savings by the use of water power representing the value of this power was divided and one part assigned to the utility and the other to the public in a rate valuation. No value should be assigned to undeveloped water powers in a rate valuation.” *Re Alabama P. Co. (Ala.)*, P.U.R. 1923B, 28. “The right to develop water power in a navigable stream is not in any case a riparian right attaching to adjacent lands, but is a special right granted by the sovereign to obstruct its natural flow in a way that, unless properly safeguarded, would destroy its navigability, and as such is a grant in the nature of a franchise which has no value except such as it acquired from surplus earnings of the business, and is entitled to no allowance under the Federal Water Power Act other than what it costs to acquire in determining the original costs of such projects. . . . The valuation of power site lands on a basis of capitalized profits possible in an assumed market where price is predicated on

¹ *Re Ocean County E. Co. (N.J.)*, P.U.R. 1916D, 77; *Re Escanaba P. & Traction Co. (Mich.)*, P.U.R. 1931D, 152; *Peterson v. Washington Water P. Co. (Idaho)*, P.U.R. 1918F, 591; *Re Franklin L. & P. Co. (N.H.)*, P.U.R. 1922A, 506.

the cost of steam generated power is a long discredited theory." *Re Alabama P. Co.* (Fed. P.C.), P.U.R. 1932D, 345.

Natural-gas Leaseholds.—The value of natural-gas leaseholds depends upon the average cost of such property as shown on the books of the company. In some districts with shallow sands, the life of a gas-producing property is only a few years, and in fields with deep wells and high initial production for each well the life is for a long period of years. To be of any weight in a valuation proceeding, the determination of value should be of recent origin rather than several years earlier, since the value shifts with the probable unused volume.¹

Favorable Contracts.—Favorable contracts have sometimes been offered as of intangible value in determining a rate base. Such contracts may be entered into at arm's length with a company having no intercorporate relations with the operating utility seeking the rate base. When they are so entered into, the cost of the service or commodity, such as natural gas, electricity, or water, is paid for out of operating expenses. Where the contract is made with an intercorporate related company, the commission usually looks more closely at the value of the service. It is usually held that no intangible value may be allowed for such favorable contracts, for the public utility in its operations and in its contracts should show ordinary business judgment required of the management of such enterprises. Although no extra value may be allowed for this claim, a higher rate of return is sometimes allowed on the basis of rewarding high efficiency of management.²

Patent Rights.—In some cases the possession of patent rights owned and developed by a utility puts the utility in a position to make a considerable saving in its operating expenses as well as in the cost of the installation. The royalties that would have

¹ *Re Clarksburg L. & H. Co.* (W. Va.), P.U.R. 1917A, 577; *Natural Gas Co. v. Public Service Comm.*, 95 W. Va. 557, 121 S.E. 716, P.U.R. 1924D, 346; *Re American Indian Oil & Gas Co.* (Okla.), P.U.R. 1924E, 114; *Re United Fuel Gas Co.* (W. Va.), P.U.R. 1925B, 705; *Re Cumberland & Allegheny Gas Co.* (W. Va.), P.U.R. 1928B, 20; *Re Logan Gas Co.* (Ohio), P.U.R. 1929A, 233; *Dayton P. & L. Co. v. Ohio Pub. Service Comm.*, 292 U.S. 290, 78 L. ed. 1267, 54 Sup. Ct. 647 (1934), 3 P.U.R. (N.S.) 279.

² *Herring v. Clark's Ferry Bridge Co.* (Pa.), P.U.R. 1926D, 516; *Re Duluth S. R. Co.* (Minn.), P.U.R. 1927A, 42.

to be paid to an owner of these patents, not connected with the management of the utility, also would be charged to the operating expenses of the utility. Either an extra allowance may be made in the rate base for these patent rights, or an extra allowance for rate of return may be made for the use of these patent rights.¹

¹ *Pacific Gas & E. Co. v. San Francisco*, 265 U.S. 403, 68 L. ed. 1075, 44 Sup. Ct. 537, P.U.R. 1924D, 817; *Re Chicago R. Co. (Ill.)*, P.U.R. 1921A, 466.

SECTION II

DEPRECIATION

CHAPTER VII

NATURE AND KINDS OF DEPRECIATION

General.—As soon as—if not before—a utility is ready to render service, some parts begin to lessen in value because of the use to which they are put, and other parts are affected by the elements, to the extent that, sooner or later, some expense must be incurred to keep the utility functioning by replacement of parts. Railroad ties decay, electric conductors fatigue and break, poles decay, rails rust and become weakened by use, boilers in a steam generating plant deteriorate, automobiles become “worn out,” etc. The effect of such deterioration as the above is known as “physical depreciation.” In addition to these causes, certain portions of a utility property are discarded because of inadequacy or obsolescence. New discoveries, inventions, and developments in the art produce more efficient means of accomplishing the purpose for which the older parts were installed and make it desirable to substitute new equipment for the old. This depreciation caused by obsolescence or inadequacy is known as “functional depreciation.”

“As surely as humanity travels to the grave, the machinery and equipment of a public utility corporation travel toward the scrap pile. The plant and structures depreciate in less degree but as certainly.” *People ex rel. Brooklyn R. Co. v. State Tax Comm’rs*, 69 Misc. 646, 127 N.Y. Supp. 825. “A water plant, with all its additions, begins to depreciate in value from the moment of its use.” *Knoxville v. Knoxville Water Co.*, 212 U.S. 1, 29 Sup. Ct. 148, 53 L. ed. 371. “The process of depreciation is not a thing which can be divided into epochs, and different principles for its determination applied to each. To the contrary, depreciation of physical property, like decay of any kind, is a single process. It began in the past, it is going on in the present, and it will continue to

go on in the future. It is in fact, a single process and should be so regarded." *Re Chesapeake & Potomac Tel. Co. (Md.)*, P.U.R. 1916C, 925.

Ordinary business prudence dictates that money should be set aside out of earnings, to enable the owners to replace portions of the property when they are worn out, not necessarily with equipment exactly similar but with equipment that will render the same service and perform the same functions. The customers receiving the service that is responsible for this wearing out should pay for this property which is to be replaced at some future date. In other words, the customers using the service should pay the operating expenses and should also pay for the property "used up" in rendering the service. If such a provision is not made, the customers will have received more than they have paid for, and the property of the utility will have been taken from the owners thereof without due compensation. Conversely, if too large amounts are set aside for this purpose, the customers will have paid more than they should have.

With functional depreciation, however, this matter is not so well established. A generator may still have many years of useful life; but, because of advances in the art, the old generator may be so inefficient compared with a new unit that it will pay the utility to discard the old unit and substitute the new one. In such a case, the increased efficiency of the new unit should be sufficiently great so that the lower operating expenses will permit the abandonment of the old unit and ultimately enable the utility to render service to its customers at a lower cost than before. In other words, the amortization expense of retiring a piece of property before the end of its expected life should be taken care of partly by the savings resulting from using the new equipment and partly by the customer.

All portions of a utility do not wear out at the same rate; in fact, some parts do not wear out at all. Boiler tubes in locomotives are replaced frequently, bearings in machinery may have to be replaced because of wear, some poles decay more rapidly than others, water and gas pipes may rust and new ones be substituted, etc. Some of these replacements are properly charged to maintenance and others, especially those not requiring frequent replacement, to depreciation. In fact, the "deacon's one-hoss

shay" is the only piece of equipment in which depreciation was the same for all its parts. To provide for sufficient money to take care of the extraordinary maintenance requires the setting aside of a sum each year, so that when the extraordinary maintenance occurs it can be paid for with the sum of money accumulated.

That such an annual allowance should be charged to the operating expenses of a utility by right as well as by duty has not always been conceded by courts and commissions. However, the approval by the highest courts is unanimous at the present time. The method of accumulating the fund as well as its investment has not been so well understood, and the methods differ from commission to commission. The practice of deducting the balance in the depreciation reserve, or the amount by which the property has depreciated, from the reproduction cost new to obtain the present value of the property is not well understood, and the practice of commissions in this regard is not so uniform as is the approval for setting aside the reserve. A commission and a court decision follow:

"The depreciation of a plant, though it may not be as apparent, is just as real and substantial a charge against revenues as wages paid to operators or any other employee of the company." *Re Lincoln Tel. Co.*, 6 Neb. S.R.C. 191. "In determining the accrued depreciation of the physical properties of a utility, consideration must be given to such elements as obsolescence, inadequacy, physical change, supercession, development of the art, and change in the requirements of the public." *Re Natural Gas Co. of West Virginia* (1934), 115 W. Va. 149, 175 S.E. 339, 5 P.U.R. (n.s.) 471.

That the allowance of a sufficient additional income for depreciation was not always permitted is shown by early decisions, which disapprove an allowance for depreciation as an operating expense chargeable to the rate payers, as follows:

Judge Weaver, in an Iowa Supreme Court case, says:

"We see no reason why the plaintiff, in addition to operating expenses, repairs, and other ordinary charges should be allowed to reduce the apparent profits by reductions for restoration or rebuilding fund. The setting aside of such a fund may be good policy, and, if the company sees fit to devote a portion of its profits to that purpose (though, as we understand the record, no such fund has been created), no one can complain; but it is in no just sense a charge affecting the net earnings

of the works. To hold otherwise is to say that the public must not only pay the reasonable and fair value of the service rendered, but must in addition pay the company the full value of the property every 40 years,—the average life estimated by the plaintiff,—for all time to come." *Cedar Rapids Water Co. v. Cedar Rapids*, 118 Iowa 234, 91 N.W. 1081. The opposite view was taken by the same court after the Knoxville Water Co. (*supra*) decision, in *Cedar Rapids Gas L. Co. v. Cedar Rapids*, 144 Iowa 426, 120 N.W. 966.

Much of the misunderstanding undoubtedly has occurred because of the confusion in the minds of the courts and commissions between accounting practice and the depreciation itself. The first is a means of providing for compensation and the second is the actual occurrence. These differences in point of view must be kept in mind in the following discussions.

Kinds of Depreciation.—As stated in the first section, there are two general kinds, or classes, of depreciation: physical and functional. Physical depreciation was described as the result of deterioration due to wear and tear. It results from use, decay, and the action of the elements. Functional depreciation is the result of adaptation to function. It results from changed conditions and surroundings that render the structure ill-adapted to its work; from growth of the business which renders the structure inadequate; from decline in the business which renders the structure too large; from the development of the art which makes desirable the substitution of other methods, equipment, and structures; and sometimes from the demands of public authorities. Physical depreciation is a constant factor; it begins as soon as the structure is exposed to the action of the elements or is put to use. Functional depreciation is fortuitous; it may come into play during the lifetime of a particular structure, and it may not. It is similar to loss by fire, flood, or other catastrophe, which cannot be predicted but which can be insured against.

Maintenance and depreciation are very closely connected. With good maintenance, the physical depreciation is small, and by constant replacement of worn-out parts the entire machine can be kept in good continuous operating condition, so far as wear and tear are concerned. However, with growing enterprises and with changing engineering practice, brought about by causes outside the operation of the utility, supercession will need to be provided for by some kind of retirement reserve. From

this point of view, depreciation may be defined as the loss in value which cannot be restored by current maintenance.¹

Definitions and Causes.—"It should be remembered that most utility industries are characterized by relatively large amounts of durable fixed capital capable of rendering service over more than a single accounting period."² The following definitions of depreciation are taken from a variety of sources:

"Depreciation is the amount which must be set aside by an operating company to cover wear and tear, general decay, obsolescence, and inadequacy." Holmes on Regulation of Railroads and Utilities in Wisconsin, p. 79. "The loss or shrinkage of value which inevitably occurs from time to time in the equipment of the plant as the result of the employment of this equipment, due to wear and tear, to age, to the march of modern invention, or to inadequacy, or to any or all of these causes combined." *Re Cumberland Municipal L. Plant*, 4 Wis. R.C.R. 214. "Broadly speaking, depreciation is the loss, not restored by current maintenance, which is due to all the factors causing the ultimate retirement of the property. These factors embrace wear and tear, decay, inadequacy, and obsolescence." *Lindheimer v. Illinois Bell Tel. Co.*, 292 U.S. 151, 78 L. ed. 1182, 54 Sup. Ct. 658 (1934), 3 P.U.R. (N.S.) 337.

Inadequacy and Obsolescence.—These two aspects of functional depreciation are usually considered together. The physical type of depreciation has long been recognized, and its treatment is rather generally fixed under modern methods of accounting and regulation. However, functional depreciation does not lend itself so readily to prediction or allowance as does that of the former type. Functional depreciation may be brought about by changes in the art, changes in the habits of the people, or by legislation. The introduction of machine switching for operation of telephone exchanges and of the hand sets for the older desk and wall sets has caused a rapid change in values in

¹ Alonzo Burt, president, Wisconsin Tel. Co. in *Payne v. Wisconsin Tel. Co.*, 4 Wis. R.C.R. 1; *Antioch v. Pacific Gas & E. Co.*, 5 Cal. R.C.R. 19, 39.

² Depreciation, A Review of Legal and Accounting Problems, Public Service Comm. of Wisconsin, 1933; *People ex rel. Jamaica Water Co. v. Tax Commrs.*, 196 N.Y. 39, 89 N.E. 581; *Webster Tel. Co. (S.D.)*, P.U.R. 1915E, 516; *Re Michigan State Tel. Co. (Mich.)*, P.U.R. 1923A, 30; *Re Natural Gas Co. of W. Va.*, 115 W. Va. 149, 175 S.E. 339 (1934), 5 P.U.R. (N.S.) 471.

the telephone plant. The introduction of newer types of steam production such as higher pressures and temperatures into the operation of electric plants followed the introduction of the steam turbine which replaced the reciprocating engines. The introduction of natural gas for artificial gas causes the retirement of gas-generating property unless it is useful as stand-by property for emergency use. The introduction of the higher efficiency electric lamps resulted in the retirement of the older series arc lamps from the streets, and later the gas lights were displaced from both interior and exterior illumination by electric lights. The early introduction of the interurban electric traction systems had the effect of taking away the short-haul custom in both passengers and freight from the steam railroads; these systems of transportation were later to be affected by the introduction of automobiles, buses, and trucks using the highways. The introduction of the lightweight high-speed passenger trains and the longer freight trains with much faster schedules and lower costs of transportation are just now regaining some of the lost traffic for the steam railroads. In some cases electrification of trunk lines and terminals of railroads has been necessary to meet competition of speed and convenience for long- and short-haul transportation.

All these changes have in the past made and are at present making necessary rapid retirement of property before the equipment that is being displaced has reached the end of its physical life. Regulatory bodies are not yet unanimous as to the allowance to be made for this type of depreciation. Since customers are obliged to pay the entire cost of operation, which includes the property that is "used up," providing for functional depreciation may be asking present customers to pay more than is actually incurred in supplying the service to them. On the other hand, it does not seem equitable to the utility to base a depreciation allowance on the assumption that a particular piece of equipment will have a service life of 25 years when competition from some outside source may compel its retirement in 10 years.

Regulation is sometimes necessary to protect the public from paying excessive rates when new and more efficient equipment is substituted for old and existing equipment. Under such a condition the customers have a right to discard the old utility and to replace the service with the new, the utility thus being

forced to abandon a portion of its property at an early date without having accumulated a sufficient amount in the reserve to amortize the entire cost of the retirement. The same cannot always be said when the utility is owned by a governmental agency. In this case the costs of retirement must be paid by the customers in the form of either rates or taxes.

Before the question regarding functional depreciation can be satisfactorily answered, it is necessary to recall that some utilities are more truly monopolistic than others. In competitive business, each firm must sell its product in competition with other firms making the same or a similar product, and if one of these adopts a newer and cheaper method of manufacture it is able to undersell the others, with the result that these others are forced to adopt new and cheaper methods of production. The functional depreciation of all manufacturers except the first one adopting the new method is caused by forces *external* to themselves, whereas that of the first was caused by an *internal* force. In the case of a complete monopoly there are no external forces operating, so there will be no functional depreciation unless the expectation of greater profits in the future causes the internal forces to act. There are very few, if any, complete monopolies but many partial ones, so one may conclude that functional depreciation is somewhere between the extremes of complete monopoly and free competition.

If a piece of equipment must be retired because of forces external to the organization, it is not at all certain that the value remaining in the old equipment can be amortized by savings in operating expenses effected by the new. Therefore a fund, an insurance against early retirement, should be set aside, which can be drawn upon when needed, to retire a piece of equipment when necessary to keep abreast of the times.¹

Accounting v. Actual Depreciation.—Some utilities have looked upon depreciation only as an accounting method of setting aside a certain sum, not actually held in any fund, which represents on the books of the company the amount of depreciation in the property. Most commissions treat the depreciation reserve as an actual sum set aside and invested in securities and

¹ People ex rel. Brooklyn Heights R. Co. v. Tax Comm'rs, 69 Misc. 646, 127 N.Y. Supp. 925; Hoffman v. Elmira Water L. & R. Co. (N.Y. 2d Dist.), P.U.R. 1920D, 266.

which may be drawn upon at the time of retirement of the particular part of the property which has reached the end of its useful life. A variation of this latter consideration is that in which the utility is permitted to invest part of the depreciation reserve in the additions to its property. These methods will be discussed later, and the different ways of treatment of accrued depreciation growing out of these and other considerations will be considered. The California Commission discussed depreciation in the following cases:

"A utility operates in an unsound and short-sighted manner in treating depreciation reserve as a book account only, and in using the fund for extensions and betterments without providing for considerable replacements of depreciable property that will inevitably occur." *Re San Fernando Tel. Co. (Cal.)*, P.U.R. 1920B, 807. "I am of the opinion that the plant has reached a state where it is unwise to continue with the present method of treating depreciation as a bookkeeping proposition only. I believe that in the future a depreciation fund should be set aside and so held that money will be available when renewals are necessary and that this fund should be used for no other purpose." *Re Reedley Tel. Co. (Cal.)*, P.U.R. 1920C, 512.

Condition per Cent and Scrap Value.—The "scrap value" of a unit of property is its value or fair market price as old material after the cost of removal has been deducted. "Condition per cent" is sometimes used in describing the present condition of the property as a whole as compared with the property when new. These two terms are sometimes used in the consideration of the present value of a utility; the amount to be depreciated being the cost less the scrap value. When the condition per cent is determined by the inspection of the property, it is difficult to appraise all parts, particularly those which are concealed, such as pipes and conduits, and also to allow for the elements of functional depreciation. Theoretically, condition per cent should equal the cost of the property less the accrued depreciation, allowance being made for the scrap, or salvage, value. Actually this is never possible because the fund is accumulated to take care of two kinds of depreciation, *i.e.*, insurance against obsolescence and physical deterioration.¹

¹ Report of Ohio Joint Committee on Valuation, 3 P.S.R. 649; Report of the Physical Valuation of Nebraska Railways, 4 Neb. S.R.C. 447; *Re Potomac Edison Co. (Md.)*, P.U.R. 1933B, 6; *Re City of Oroville (Cal.)*, P.U.R. 1922E, 451.

Distinction between Depreciation and Maintenance.—Both depreciation and maintenance are items to be paid for out of the income of a utility before the net return is calculated. It is usual practice to consider as maintenance the renewal of such items as are expended from day to day to keep the property in good operating condition, whereas depreciation is applied to larger items of replacement which occur only infrequently. Some items are easily classed as maintenance and others as depreciation. There is a considerable list that may be classed as either. A low order of maintenance will require a high charge to depreciation. Deferred maintenance may ultimately accumulate into large items that might later be classed as depreciation. The renewal of a flue in a boiler or the repairs to its setting would be classed as maintenance of the plant. The renewal of the boiler or an entire new setting would, however, be paid for from the depreciation reserve, in so far as the new article exactly replaced the old and did not enlarge its capacity or change its character. However, the neglect to renew ties under rails or to replace an occasional rail until it is necessary to renew an entire section or division would be classed as deferred maintenance. Relaying the rails and replacing the ties on account of a change in weight of rail, made necessary by heavier traffic, or the relocation of the line to eliminate curves and grades would be partly depreciation renewal and partly extensions and betterments. It is difficult at times to make accurate allocations of these expenditures.¹

Concerning the charges on small items, the Uniform Classification of Accounts prescribed for Public Utilities by the Federal Power Commission, effective Jan. 1, 1937, Section 12C, page 49, reads as follows:

(1) When a minor item of property which did not previously exist is added to plant, the cost thereof shall be accounted for in the same manner as for the addition of a unit of property, as set forth in paragraph B (1), above, if a substantial addition results, otherwise the charge shall be to the appropriate operating expense account. (2) When a minor item of property is retired and not replaced, the book cost thereof shall be credited to the electric plant account in which

¹ *Re Home Tel. Co. (Ind.)*, P.U.R. 1918A, 27; *Spring Valley Waterworks v. San Francisco*, 192 Fed. 137; *Twenty-seventh Annual Report Ass'n R. Comm'rs*, p. 250; *Re Long Island R. Co. (N.Y. Transit)*, P.U.R. 1928C, 748.

it is included; and, in the event the minor item is a part of depreciable plant, the depreciation reserve shall be charged with the book cost and cost of removal, and credited with the salvage. If, however, the book cost of the minor item retired and not replaced has been or will be accounted for by its inclusion in the unit of property of which it is a part when such unit is retired, no separate credit to the property account is required when such minor item is retired. (3) When a minor item of depreciable property is replaced independently of the unit of which it is a part, the cost of replacement shall be charged to the maintenance account appropriate for the item, except that if the replacement effects a substantial betterment (the primary aim of which is to make the property affected more useful, more efficient, of greater durability, or of greater capacity), the excess cost of the replacement over the estimated cost at current prices of replacing without betterment shall be charged to the appropriate electric plant account.

CHAPTER VIII

NECESSITY OF PROVIDING FOR DEPRECIATION

In General.—Providing for depreciation has long been recognized as a good business policy for any type of enterprise. However (as discussed in Chap. VII), for a public utility to set up such a fund and to charge the accumulations for this fund to operating expenses as a right and duty was not so evident at the beginning of regulation as it is today. The early decisions in some courts of appeal were adverse to this allowance. The changing opinion in this respect is well expressed by chairman Towers of the Maryland Commission in the following citation:

Thirty years ago, or even twenty years ago, the theory of the depreciation reserve was hardly known, much less generally understood. As we know it today, it is an evolution in accounting so far as applied to public utilities. It has, of course, always been understood that a business man must make provision in advance against the time when the property used in his business will wear out and be no longer fit for use. But the idea that the proprietor of a public utility has the absolute right to charge the public a sum sufficient to create and maintain such a reserve was born of the necessity which arose when the states first began to engage actively in the regulation of rates, and to say that a man engaged in a public business of this character should be limited in his profits to a fair return on his investment.—*Re Chesapeake & Potomac Tel. Co. (Md.)*, P.U.R. 1916C, 925.

As an Operating Expense.—Even though it was recognized by the courts that a reserve for depreciation should be set up by the utility as a good business policy, it was not at first recognized that this was a legitimate charge to operating expenses. It was thought by some that the provision should be made from net return rather than from expenses and should be a first lien on that return before dividends or interest on bonds was allowed. The California Commission has said:

It is evident that when track and equipment wear away and must be replaced and there is no money available for such replacement, oper-

ating expenses must increase, the value of the property must dwindle, the capital account must be inflated, and, what is perhaps more important, service must deteriorate. Without exception, almost all street railway properties, not only in California but throughout the United States, are today confronted with this deplorable condition. And this cost of service is made up of three chief items of expense; namely, cost of operation, taxes, and cost of money. Included in the cost of operation is the cost of maintaining service. Included in the cost of maintaining the property is the cost of depreciation.—*Re San Francisco-Oakland Terminal Railways (Cal.)*, P.U.R. 1920A, 115.

In the *Illinois Bell Telephone Case*, the United States Supreme Court said: "A company alleging that rates fixed by a Commission are confiscatory has the burden of making a convincing showing that the amounts charged to operating expenses for depreciation have not been excessive." *Lindheimer v. Illinois Bell Tel. Co.*, 292 U.S. 151, 78 L. ed. 1182, 54 Sup. Ct. 658 (1934), 3 P.U.R. (N.S.) 337.

Right of Company to Depreciation Allowance.—The right of a public-utility company to the depreciation allowance was settled in the *Knoxville Water Company Case* in 1909, as follows:

Before coming to the question of profits at all, the company is entitled to earn a sufficient sum annually to provide not only for current repairs, but for making good the depreciation and replacing the parts of the property when they come to the end of their life. The company is not bound to see its property gradually waste, without making provision out of its earnings for its replacement. It is entitled to see that from earnings the value of the property invested is kept unimpaired, so that, at the end of any given term of years, the original investment remains as it was at the beginning. It is not only the right of a company to make such a provision, but it is its duty to its bond and stockholders, and, in the case of a public service corporation, at least its plain duty to the public.—*Knoxville v. Knoxville Water Co.*, 212 U.S. 1, 53 L. ed. 371, 29 Sup. Ct. 148.

Two more recent cases decided by the same court in 1934 reiterate the same opinion:

"In determining reasonable rates for supplying public service, it is proper to include in the operating expenses an allowance for the consumption of capital in order to maintain the integrity of the investment in the service rendered." *Lindheimer v. Illinois Bell Tel. Co.*, 292 U.S. 151, 78 L. ed. 1182, 54 Sup. Ct. 658 (1934), 3 P.U.R. (N.S.) 337. "Statutory procedure for rate making results in unconstitutionally depriving

a gas company of its property without due process of law where the privilege of including a depletion allowance among its operating expenses is withheld, while confining the utility to a return of 6.5 per cent upon the value of its wasting assets, at least where the waste is inevitable and rapid, since the state, if it limits the return, must concede to the business a compensating privilege to preserve its capital intact." *Columbus Gas & Fuel Co. (Ohio 1934)*, 4 P.U.R. (N.S.) 152, sustained in 292 U.S. 398, 78 L. ed. 1327, 54 Sup. Ct. 763.

Duty to Provide for Depreciation.—That it was not only the right of the utility to provide for depreciation but also its duty was decided in the *Knoxville Water Company Case (supra)*. It is not only in the interest of the owners of the utility to see that this provision is made, but it is also necessary from the point of view of the public, for a utility without a reserve of this character is operating on unsound business principles and ultimately will be unable to provide the quality of service to which the public is entitled. In the case of municipally or federally owned utilities, this requirement is just as important, for replacements are made from this fund from time to time. Any utility without such a fund must either increase its expenses in the year when this replacement is made, necessitating an increase in rates where the replacement item is a large one compared with the normal operating expenses, or must issue new securities to cover the expense. These new securities would represent no new capital, so that if this practice is continued the amount of securities outstanding will soon be greatly in excess of the rate base. Failure to provide this reserve leads for a time to an apparently low operating cost. With adequate rates, this is equivalent to disbursing the depreciation reserve as dividends. The annual payment to the reserve should be made before any calculation of dividends; if the net earnings are insufficient for the stated dividends, after setting aside the reserve, then the dividends and not the reserve must suffer. To pay dividends while not providing for depreciation is equivalent to taking property from the bondholders and giving it to the stockholders.¹

¹ Spurr on Guiding Principles of Rate Regulation, Vol. II, p. 288; *People ex rel. Jamaica Water Supply Co. v. State Tax Comm'rs*, 128 App. Div. 13, 12 N.Y. Supp. 392; upheld in 196 N.Y. 39, 89 N.E. 581; *Re Bay State Rate Case (Mass.)*, P.U.R. 1916F, 221; *Re Chesapeake & Potomac Tel. Co. (Md.)*, P.U.R. 1916C, 925; *Public Service Comm. v. Empire Dist. E. Co. (Mo. 1936)*, 13 P.U.R. (N.S.) 478.

Treatment of Functional Depreciation.—The practice among commissions in regard to treatment of functional depreciation is not so uniform as is that for physical depreciation. It is clear that some portion of this amount should be provided for in the depreciation reserve, particularly that part which covers predictable amounts involving changes that do not represent increase in efficiency of operation of the company.¹ These changes may be more or less annual, as caused by small alterations in the design of portions of the equipment, or they may be caused by variations in public demands, such as those made necessary by changes in laws or ordinances. Whenever the change is made by the utility to provide for increase in efficiency in the plant and a lowering of the costs of operation, the commissions have held that part or all of this functional depreciation should be cared for from the savings and be paid for by those in the future who obtain lower rates due to the lower operating costs.²

It is common practice to insure buildings against loss by fire and windstorm; to insure against loss by accident, as, for example, fly-wheel insurance and boiler insurance; or to insure against loss from any hazard connected with the operation of the company. If it were possible to insure against loss from functional depreciation, however caused, whether by development of the art, new discoveries, action of public authorities, or any other risk, such insurance might be treated as any other similar charge and allowed as an operating expense. When viewed in this light, there seems to be little reason for not including an item for functional depreciation in the operating expenses, the magnitude of which would be governed by the particular piece of equipment at its particular location. The chance of a steam generating station becoming obsolete because of development of the art is much greater than that of a hydroelectric generating station. The efficiency of conversion of falling water to electric power is better than 80 per cent at present, whereas the efficiency of converting heat units in coal into electrical energy is in the neighborhood of 20 per cent. One might conclude, therefore,

¹ *Stone v. New York Tel. Co.* (N.Y.), P.U.R. 1921D, 736; *Re Ohio Bell Tel. Co.* (Ohio 1934), 2 P.U.R. (N.S.) 113.

² *Re Great Falls Gas Co.* (Mont.), P.U.R. 1928E, 804; *Kansas City R. Co. v. United States*, 231 U.S. 423, 58 L. ed. 296, 34 Sup. Ct. 125.

that insurance against supercession of a steam plant would be more expensive than that for a water-power plant.

Economic improvements by owners of their own volition occur when they are assured that they will receive some (not necessarily all) of the benefits resulting therefrom, *i.e.*, if the retirement expense is partly amortized out of future earnings. Economic improvements caused by exterior forces should be insured against before their occurrence, by accumulating a reserve similar to reserves accumulated by insurance companies. When this principle is recognized, it is at once apparent also that the amount in the depreciation reserve may be considerably greater than the observed depreciation of the property. For example, the condition per cent may be estimated to be 90, and the amount in the depreciation reserve may be 25 per cent of the original cost; this indicates an excess accumulation of 15 per cent. One cannot necessarily conclude that the reserve is excessive because of this situation. It simply means that the 15 per cent is a reserve to take care of functional depreciation. As mentioned previously, if the utility had paid this 15 per cent to some insurance company, the utility's depreciation reserve would be only 10 per cent and no one would find fault because the condition per cent plus the reserve would equal the original cost.

Extensions Not Paid For by the Company.—It is customary to extend electric lines and mains for gas or water to serve new customers according to some rule governing extensions. These rules are not the same for each company but are all based on the fundamental principle of securing sufficient income from service supplied from the extension to justify its construction. In certain instances prospective customers are located a considerable distance from existing facilities, *i.e.*, beyond the free allowance; in such cases they are asked to pay the amount by which the cost of the extension exceeds the free allowance. Where such payments are made, the title to the extension is usually transferred to the utility, the payment being earmarked "contributions for extension" or "contributed capital," and the utility, because of its ownership, obligates itself to maintain and replace such extension when necessary. The only expense saved is the interest on the contributed amount; therefore, the utility must include depreciation on the entire extension in its operating expense.

Sometimes, when extensions are extremely long, ownership is not assumed by the utility, in which event maintenance and depreciation need not be included, for a utility should not maintain property to which it does not hold title.

Full allowance should be made for annual depreciation expense accruals on electric line extensions towards which customers have contributed, so that property can be replaced when its service life is ended.—*Department of Pub. Service v. Grays Harbor R. & L. Co.* (Wash. 1936), 12 P.U.R. (N.S.) 178; and *Department Pub. Service v. Pacific P. & L. Co.* (Wash. 1936), 13 P.U.R. (N.S.) 187.

CHAPTER IX

DEPRECIATION FUND OR RETIREMENT RESERVE

Purpose of Reserve.

The depreciation reserve evidences the extent to which provision has been made, at a given time, for the depreciation of property, and the extent to which the owner has been reimbursed for the original investment in the property, part of the service life of which, and, hence, aggregate service capacity has expired. . . . The balance in the reserve is the excess of past depreciation expense charges, offset by additions to the reserve, over the net losses sustained by plant retirements against the reserve measured by the difference between the cost of the property retired, and charged to the depreciation reserve, and the net salvage recovered from the plant retired. The net salvage is the difference between the value placed upon the property recovered and the cost of removal. If the cost of removal exceeds the salvage, the excess is referred to as negative net salvage.¹

There are two opposite views as to the purpose of the fund—if any is provided—and as to the reason for its accumulation. The first of these views is that of keeping the investment intact and spreading the charges for depreciation uniformly over the service life of the property. The second view is that the fund is to provide for replacements and that this may be done in any manner, such as payment of the sums from operating expenses as they fall due; or to set aside into a fund, if any is provided, only in years when the profits of the business permit this payment after provision has been made for interest and dividends. These two points of view will be discussed separately.

Service Life Accounting Method.—The present value of a utility is said to be the reproduction cost less the depreciation in the property. Where the amount of securities issued is equal to the investment, the investor is interested in some means of keeping this investment intact in the property. As the property

¹ Depreciation, a Review of Legal and Accounting Problems, Public Service Comm. of Wisconsin (1933).

lessens in value during its service life, owing to deterioration from any cause, there should be established a sinking fund that will just equal the decrease in value of the property. If this sinking fund is just equal to the total depreciation in the property, it will serve two purposes, that of keeping the investment intact and that of equalizing the burdens of depreciation by making the annual charges to the fund more equal, there being an increase only with the rise in value of the property, in spite of the unequal withdrawals from the fund to make replacements as they become necessary. This can never be done exactly because the rate of depreciation cannot be determined in advance.¹

To Provide for Replacements.—It may be possible for very large utilities to provide for replacements as an annual expense of the company. This practice has been common for some large trunk-line railroads, in which these renewals are more or less uniform from year to year. However, even with such utilities, this system leads to loose methods of accounting. It becomes the custom to make large renewals and replacements only in years of large profits from operation and to defer both maintenance and replacements in lean years. This method causes the issuance of dividends on stocks and the payment of interest on bonds from a fictitious net return. Where the sum for depreciation is set aside in a uniform amount each year before dividends are paid and where the provision for maintenance of the property is also uniform from year to year, independent of the amount of profits or losses, it is possible to make a truthful comparison of annual operating expenses and net-income statements. The use of the depreciation reserve, as providing only for renewals, also neglects accruing depreciation from causes other than physical wear and tear of the property. The California Supreme Court made the following ruling: "The money to make the replacement must come from the depreciation reserve fund. The object of the fund is to prevent confiscation and for the protection of the public

¹ *Clarksburg L. & H. Co. v. Public Service Comm.*, 84 W. Va. 638, 100 S.E. 551, P.U.R. 1920A, 639; *Re Cumberland T. & T. Co. (La.)*, P.U.R. 1922E, 86; *Re New York Tel Co. (N.J.)*, P.U.R. 1926C, 767; *Re Wisconsin-Minnesota L. & P. Co. (Wis.)*, P.U.R. 1920D, 428; *Re United R. Co. of St. Louis (Mo.)*, P.U.R. 1928F, 419; *Report of Committee on Statistics and Accounts of Public Utilities*, 28th Annual Convention Nat. Ass'n Railway Comm'rs (1916), p. 152; *Re Holyoke S. R. Co. (Mass.)*, P.U.R. 1918B, 212; *Re United R. Co. (Mo.)*, P.U.R. 1919F, 264.

service by providing for renewals of parts of the plant when necessary." *Union Hollywood Water Co. v. Los Angeles* (1920), 184 Cal. 535, 195 Pac. 55.

In a public utility there are a great many different pieces, or units, of property, some of which have a short life and others long. A large unit of property may be made up of a number of small units, and if the small units are replaced with new equipment when worn out, the large unit may remain intact. Certainly, if the smaller component parts were not replaced when worn out, the length of life of the entire unit would be no longer than the life of the component part that wears out or is used up soonest. Replacement of short-lived pieces, if each such piece is a unit and depreciation is provided for on a unit basis, would mean no charge to maintenance for replacement purposes. If, however, several of these pieces constitute a unit, the replacement can be charged to maintenance, and depreciation funds can be accumulated to retire the large unit when it reaches the end of its useful life.

For example, consider that a unit of property is made up of 20 small pieces each costing \$100 and that the first piece must be replaced at the end of one year, the second at the end of two years, the third at the end of three years, etc. The average annual expense over the 20-year period would be

$$\$100(1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \dots + \frac{1}{20}) = \$360.$$

Instead of trying to decide whether to charge some replacements to maintenance or depreciation, by setting aside \$360 per year, all replacements can be charged to depreciation as shown in Table I.

Since one of the units is replaced every year, the cost of replacing this particular unit could be charged to maintenance. If this were done, the records would show an annual charge of only \$260 to depreciation, an increase in maintenance of \$100 per year, and the last two columns of Table I would remain unchanged.

In actual practice it is sometimes difficult to know whether to charge the replacement to maintenance or to depreciation reserve. Obviously, if such items are charged to maintenance, it is unnecessary to charge them to depreciation; hence a smaller annual charge to depreciation need be made. The extent of injustice to customers or to security holders depends upon how

the extra maintenance affects the rates and the ability to pay securities when due. However, when the rate base is reduced by the amount accumulated in the depreciation reserve and the amount set aside annually has been greater than that actually found by experience to have been necessary, the customers may be considered as having invested something in the property.¹

TABLE I
Charge each year is \$360

| Year | Replacement expense | Balance left | Accumulated balance |
|------|------------------------|-----------------|------------------------|
| 1 | \$100 | \$260 | \$ 260 |
| 2 | 200 | 160 | 420 |
| 3 | 200 | 160 | 580 |
| 4 | 300 | 60 | 640 |
| 5 | 200 | 160 | 800 |
| 6 | 400 | — 40 | 760 |
| 7 | 200 | 160 | 920 |
| 8 | 400 | — 40 | 880 |
| 9 | 300 | 60 | 940 |
| 10 | 400 | — 40 | 900 |
| 11 | 200 | 160 | 1060 |
| 12 | 600 | —240 | 820 |
| 13 | 200 | 160 | 980 |
| 14 | 400 | — 40 | 940 |
| 15 | 400 | — 40 | 900 |
| 16 | 500 | —140 | 760 |
| 17 | 200 | 160 | 920 |
| 18 | 600 | —240 | 680 |
| 19 | 200 | 160 | 840 |
| 20 | 600 | —240 | 600 |
| | 600* | | 0 |

* Loss in value of property not wholly retired to be replaced after 20-year period, or this can be considered the loss in value which was not restored by annual replacements.

To determine what the proper charges should be in the future resolves itself into mere opinions. No one can tell how long a particular piece of equipment will last.

Method of Accumulating the Reserve.—Numerous methods have been proposed for the accumulation of the depreciation

¹ Re Southern Cal. Tel. Co. (Cal.), P.U.R. 1922C, 97; Churchill v. Winthrop & W. L. & P. Co. (Me.), P.U.R. 1916F, 752; Re Santa Barbara Tel. Co. (Cal.), P.U.R. 1920E, 585; Spurr on Guiding Principles of Rate Regulation, Vol. II, p. 307.

reserve. Of these, only two are, in general, approved by the regulatory bodies, the *sinking-fund* and the *straight-line* methods. The sinking-fund method assumes that a certain sum is set aside each year, with the interest earned added annually to the fund, until the desired amount is accumulated for the retirement of the particular unit at the end of its assumed life. The utility gets no earnings from this fund during its accumulation. The interest rate is fixed by the regulatory body at the annual rate for such funds in the particular state and at the time of its establishment. The straight-line method consists in dividing the sum to be secured by the number of years assumed for the life of the part under consideration and setting aside this amount each year, the fund for each part accumulating by a uniform amount each year. Interest is not added to this reserve because by doing so it becomes a sort of sinking fund; instead, the utility is allowed the earnings from the reserve as income. As will be shown in the next chapter, the straight-line formula is the sinking-fund formula with zero rate of interest. Exceptions to this rule will be discussed in the next chapter. These methods are discussed and contrasted in the following citation:

The difference between the two questions is of great practical importance, and consists of this: In the sinking fund method no part of the principal of the investment is returned to the company until the original property is taken out of service, and then the fund merely takes the place of the property thus removed because it has been worn out and destroyed by public service. During the term of life of the property the company gets no benefit of the annual payment made by the public. The interest accretions are added to the principal, and at the end of the estimated life the company simply has enough money to replace the property. During the entire period the company has the same amount invested or used in the public service, and, therefore, during the entire assumed life of the property is entitled to the same amount of annual return thereon. In the straight-line method, the average estimated life destruction of capital is paid to the company each year, and hence, the amount it has invested in the public service is constantly diminishing, so far as any particular piece of property is concerned. As the amount is returned to the company, the return upon it by way of use or interest charge should, of course, cease.—*Fuhrmann v. Cataract P. & Conduit Co.*, 3 P.S.C. N.Y. (2d Dist.) 656.

Investment of the Depreciation Reserve.—Practice differs again among regulatory bodies in their attitude toward the

investment of the depreciation reserve. California and Indiana hold that all or nearly all the depreciation reserve must be kept intact and invested by the utility in safe interest-bearing securities, to be drawn by the utility from time to time as needed to supply retirement needs. The interest rate should not be so high as to require the use of risks in investment beyond safety. Other states permit part or nearly all of the fund to be invested in extensions and betterments of the utility itself. In this case the utility must pay interest to the fund at the rate agreed upon or at the rate of earnings allowed to the company. This use of the reserve serves two purposes: it invests the reserve in an earning enterprise, and it saves the utility from the necessity of borrowing the same amount from other sources for the purpose of extension of the plant.¹

The depreciation reserve should not be considered as free capital to be used at will for anything in the needs of the utility. Some commissions assume that the reserve is entirely under their jurisdiction and that no money may be expended from the reserve except by their approval. It may not be paid out in the form of dividends or used for the purpose of manipulation of the apparent earnings of the utility.² The following citations cover this aspect of the reserve:

"The accrued depreciation fund should be drawn upon only for renewals and replacements of unamortized property, and should remain intact as an individual and separate account except for such withdrawals as may be necessary to reimburse the investors for future depreciation only; that the fund should be subject to an annual audit by the Commission's accountants, should receive full credit for all interest which it may earn." *Springfield v. Springfield Gas & E. Co.*, *supra*. "We cannot agree that the reserve fund may be used by the company

¹ *Springfield v. Springfield Gas & E. Co.* (Ill.), P.U.R. 1916C, 281; *Re Virginia P. Co.* (Va.), P.U.R. 1919F, 168; *Re Tucson Gas, E. L. & P. Co.* (Ariz.), P.U.R. 1922C, 658; *Re Wisconsin Tel. Co.* (Wis.), P.U.R. 1922D, 368; *Re Laporte County Tel. Co.* (Ind.), P.U.R. 1929E, 272; *Re Southern Bell T. & T. Co.* (Tenn. 1935), 6 P.U.R. (n.s.) 464; *Re Eton Rapids* (Mich.), P.U.R. 1922D, 94; *Re Milwaukee E. R. & L. Co.* (Wis.), P.U.R. 1920A, 361.

² *Re Menominee & Marinette L. & Traction Co.*, 3 Wis. R.C.R. 778; *Meade Coal Co. v. Appalachian P. Co.* (W. Va.), P.U.R. 1923E, 221; *Public Service Comm. ex rel. Pasco v. Pacific P. & L. Co.* (Wash.), P.U.R. 1920F, 954; *Re Pacific T. & T. Co.* (Ore.), P.U.R. 1922C, 248; *Re Chesapeake & Potomac Tel. Co.* (Md. 1934), 1 P.U.R. (n.s.) 346.

for any purpose whatever which the company may find convenient. It would seem to us that the only guarantee of good faith in the expenditure of money set aside for a particular purpose and included in the rates for that purpose, is that the Commission should have charge both of the debits and the credits to the depreciation reserve fund. We contend that the Commission should be the judge of obsolescence whenever a radical change is proposed. We do not contend that either obsolescence or inadequacy should be borne entirely by the rate payer." *Southern California Tel. Co. (Cal.)*, P.U.R. 1922C, 97, 119.

Interest on Depreciation Reserve.—When a depreciation reserve is established on the sinking-fund basis, the interest must be added annually to the fund in order that the reserve may reach the proper amount at the end of the useful life of the property. When the fund is established on the straight-line basis, the interest should not be added to the fund. The annual payments to be made to the fund are estimated on the basis of no interest accretions. Since a fund or reserve will not be allowed to remain idle, there will always be some interest earned by it. If the fund is reinvested in the plant extensions, the company must either pay interest into the fund or else it will be receiving income on money it has not contributed to the rate base. In that case a deduction must be made from the reproduction cost to care for this capital which the public has furnished in the form of annual payments to the reserve. It is immaterial whether the money is paid into the reserve and then withdrawn for the extensions and betterments, or whether extensions and betterments of this order are charged to operating expenses and deducted from the gross income before the net return is calculated. Regulatory bodies differ in their treatment of these questions.¹

Commission Power over Depreciation Reserve.—The power of the various state commissions over the establishment of and payments from the depreciation reserve varies from state to

¹ Re San Francisco-Oakland Terminal R. Co. (Cal.), P.U.R. 1920A, 115; San Joaquin L. & P. Co. (Cal.), P.U.R. 1920D, 940; City of Erie v. Public Service Comm. (Pa.), P.U.R. 1929C, 568; Re Citizens Tel. Co. (Ind.), P.U.R. 1920C, 513; Re Milwaukee E. R. & L. Co. (Wis.), P.U.R. 1920A, 361; Re Douglas County L. & Water Co. (Ore.), P.U.R. 1920E, 668; Re Molalla E. Co. (Ore.), P.U.R. 1922C, 810; Re Southern California Tel. Co. (Cal.), P.U.R. 1925C, 627; Re Kentucky-Tennessee L. & P. Co. (Tenn.), P.U.R. 1932E, 397.

state. In some states the public utility laws provide that the commission shall have power to determine the annual payments to the fund as well as the expenditures for renewals and replacements, especially that part for obsolescence. In other states, the laws are silent on this point, and the commission assumes that the establishment of the reserve and its treatment by the utility are under the entire discretion of the management of the company. The commission does not have the power either to require the utility to use any credit in the depreciation reserve account to overcome deficits in operation or to lower rates in the future until the reserve is brought to its proper level.¹ This has been decided by the Supreme Court as follows:

A Commission cannot require a public utility to apply any part of the property represented by the credit balance in the depreciation reserve account to overcome deficits in present or future earnings in order to sustain rates which would otherwise be confiscatory, even though the company had charged excessive amounts to the depreciation expense in prior years.—*Public Util. Comm'rs v. New York Tel. Co.*, 271 U.S. 23, P.U.R. 1926C, 740.

¹ Re San Diego E. R. Co. (Cal.), P.U.R. 1920B, 86; Re Northern Indiana Gas Co. (Ind.), P.U.R. 1920E, 280; Reed v. China Tel. Co. (Mc.), P.U.R. 1920C, 386; Re New York Tel. Co. (N.J.), P.U.R. 1925C, 767; Re Wisconsin Tel. Co. (Wis., 1935), 9 P.U.R. (N.S.) 1; Spurr on Guiding Principles of Rate Regulation, Vol. II, p. 293; Re Chesapeake & Potomac Tel. Co. (Md.), 1 P.U.R. (N.S.) 346; Re New York Tel. Co. (N.Y. 1936), 14 P.U.R. (N.S.) 443; Re Chesapeake & Potomac Tel. Co. (D.C.), P.U.R. 1932E, 193; Re Thompson (Ill.), P.U.R. 1922A, 558; Re Home Gas & E. Co. (Colo. 1934), 5 P.U.R. (N.S.) 107; Re Butte Water Co. (Mont. 1935), 10 P.U.R. (N.S.) 26; Re Northwestern Bell Tel. Co. (Neb. 1934), 5 P.U.R. (N.S.) 20; Municipal Gas Co. v. Wichita Falls (Tex. 1935), 9 P.U.R. (N.S.) 33.

CHAPTER X

ACCUMULATION OF THE RESERVE

In the following discussion it must be clearly kept in mind as to what is to be accomplished by annually setting aside the depreciation allowance. It must also be remembered that the amount set aside is based upon the estimated useful life of the property or of the individual units comprising it. In the preceding chapters it has been assumed that the annual depreciation allowance is to equal the value of the property used up plus insurance to take care of obsolescence. One might look at the problem slightly differently and state that the fund to be accumulated should be sufficient to replace the property after it has served its useful life with new equipment capable of rendering the same service. These two purposes are different unless the price to be paid for the new unit is the same as that of the old unit when it was installed. The two methods of considering this problem will, of course, result in different charges, depending upon whether the depreciation is calculated on the original cost or on replacement cost unless these are the same. If the latter of the two points of view is to be assumed, the amount to be charged annually is dependent not only upon an estimate of the useful or service life of the property and the interest rate, but also upon an estimate of the prices that will prevail at the time the property is to be replaced. Consideration of the uncertain elements leads one to believe that, in practice at least, neither of these two methods would actually be used, but that some compromise would be made in which either a certain sum is set aside annually for depreciation and the earnings of this fund are left to accumulate along with the annual payments or the interest earnings are included with the earnings of the utility as other income; the amount rate payers are obliged to pay is thus reduced by whatever is earned from the investments of this depreciation fund.

By way of illustration, assume a property to cost \$1,000,000, its life to be 20 years and the interest rate to be 5 per cent on

both the original investment of \$1,000,000 and on the sinking fund. The annual payment under the sinking fund would be \$50,000 for interest and \$30,236 for depreciation, which makes a total of \$80,236 annually. Under the straight-line method, the interest would be \$50,000 the first year, the depreciation charge \$50,000 each year, the interest the second year would be the \$50,000 less the interest of \$2,500 earned on the sinking fund the second year, etc. The following table shows how the interest earned by the depreciation reserve acts to lessen the fixed charge (interest and depreciation).

| Year | Depreciation reserve | Interest earned | Net annual interest |
|------|----------------------|-----------------|---------------------|
| 1 | \$ 50,000 | \$ 0 | \$50,000 |
| 2 | 100,000 | 2,500 | 47,500 |
| 3 | 150,000 | 5,000 | 45,000 |
| 4 | 200,000 | 7,500 | 42,500 |
| 5 | 250,000 | 10,000 | 40,000 |
| 6 | 300,000 | 12,500 | 37,500 |
| 7 | 350,000 | 15,000 | 35,000 |
| 8 | 400,000 | 17,500 | 32,500 |
| 9 | 450,000 | 20,000 | 30,000 |
| 10 | 500,000 | 22,500 | 27,500 |
| 11 | 550,000 | 25,000 | 25,000 |
| 12 | 600,000 | 27,500 | 22,500 |
| 13 | 650,000 | 30,000 | 20,000 |
| 14 | 700,000 | 32,500 | 17,500 |
| 15 | 750,000 | 35,000 | 15,000 |
| 16 | 800,000 | 37,500 | 12,500 |
| 17 | 850,000 | 40,000 | 10,000 |
| 18 | 900,000 | 42,500 | 7,500 |
| 19 | 950,000 | 45,000 | 5,000 |
| 20 | 1,000,000 | 47,500 | 2,500 |

Under the sinking-fund method, the average annual payment for interest and depreciation over the 20-year period is \$80,236, whereas under the straight-line method this average is \$76,250. This method will be explained further in the succeeding portions of this book.

Basis for Determination.—Although several methods have been employed for the determination of present value, the commissions have been almost unanimous in using original cost as the basis for the determination of the reserve for depreciation. This method was the natural base to be used from the accounting point of view, for the original cost is known at the time of installation of the part to be depreciated, and other values fluctuate with the time of valuation. The original cost, together with the estimated useful life of the property, forms the basis of most depreciation reserves. This statement is borne out by the following citations:

“Depreciation in street railway property purchased at less than original cost should be estimated on the basis of the original cost, even on the theory that the company is entitled to a return only upon the actual amount of its investment.” *New Bedford & Onset Rate Case*, (Mass.), P.U.R. 1915F, 264. “It is the practice of the Wisconsin Commission at all times to establish the depreciation reserve on the original cost basis or upon a basis as near thereto as can be ascertained.” *Re Wisconsin-Minnesota L. & P. Co.* (Wis.), P.U.R. 1920D, 428. “Annual depreciation should be based on the original cost of utility property rather than on the reproduction cost, since it is the original cost of the property which must be accumulated to safeguard the investment for the investor.” *Re Rockford Gas L. & Coke Co.* (Ill.), P.U.R. 1922E, 756. “It is the book cost or original investment that must be amortized through the annual allowance for depreciation and depletion, and not the value of the property.” *Cumberland & Allegheny Gas Co.* (W. Va.), P.U.R. 1928B, 23.

In the *Knoxville Water Company Case*, decided by the United States Supreme Court in 1909, the court sustained the court of appeals in ruling that present value should have been used by the commission as a basis for depreciation of the property. The following is from the decision of the court in this case:

The allowance for annual depreciation, made by the Commission, was based upon the cost. The court of appeals held that this was erroneous and that it should have been based upon present value. The court's view of the matter was plainly right. One of the items of expense to be ascertained and deducted is the amount necessary to restore the property worn out or impaired, so as continuously to maintain it as nearly as practicable at the same level of efficiency for the public service. The amount set aside periodically for this purpose is the so-called deprecia-

tion allowance. Manifestly, this allowance cannot be limited by the original cost, because, if values have advanced, the allowance is insufficient to maintain the level of efficiency. The utility "is entitled to see that from earnings the value of the property invested is kept unimpaired, so that at the end of any given term of years the original investment remains as it was at the beginning." *Knoxville v. Knoxville Water Co.* (1909), 212 U.S. 1, 13, 14, 53 L. ed. 371, 29 Sup. Ct. 148.

That the commissions did not follow this decision is indicated by the foregoing commission citations, all of which are subsequent to the Knoxville Case. The commissions have held that the base should be stabilized at original cost and that, since the actual part was seldom exactly replaced and only its cost was drawn from the depreciation reserve at the time of the retirement, any excess cost of the new unit replacing the original piece should be charged as new capital. In other words, at the time of replacement, the cost of the original piece less salvage should be deducted from the capital account and the original cost of the new part, if any, should be added to capital. The amount withdrawn from the depreciation reserve, representing the original cost less salvage, either should accrue to the company to be used in the purchase of the new part or unit, if any were purchased, or otherwise be accrued as earnings of the company, reimbursing it for the capital thus removed from the service. The courts were not unanimous in their decisions in regard to this base, and in 1929 the Maryland Court of Appeals reversed the Maryland Commission in this matter. This case was carried to the United States Supreme Court which reiterated its original stand, citing also the Michigan State Telephone Company Case, decided by the Michigan Supreme Court in 1924. These decisions follow:

"Present value should be the method adopted for ascertaining an allowance for annual depreciation of utility property." *West v. United R. & E. Co. of Baltimore*, 115 Md. Ct. App. 572, P.U.R. 1929A, 1; reversing the Maryland Commission in (Md.), P.U.R. 1928D, 140. Affirmed on appeal by the U.S. Supreme Court: "This naturally calls for expenditures equal to the cost of the worn out equipment at the time of replacement; and this, for all practical purposes, means present value. It is the settled rule of this Court that the rate base is the present value, and it would be wholly illogical to adopt a different rule for depreciation. As the supreme court of Michigan, in Public Utility

Commission v. Michigan State Tel. Co. (1924), 228 Mich. 658, 666, P.U.R. 1925C, 158, 200 N.W. 749, has aptly said: 'If the rate base is present value, then the depreciation base as to depreciable property is the same thing. There is no principle to sustain a holding that a utility may earn on the present fair value of its property devoted to public service, but it must accept and the public must pay depreciation on book cost or investment cost regardless of present fair value. We repeat, the purpose of permitting a depreciation charge is to compensate

| Year | Rate base | Depreciation reserve | Interest on rate base | Interest on reserve | Net interest | Depreciation and net interest |
|------|-----------|----------------------|-----------------------|---------------------|--------------|-------------------------------|
| 1 | \$1,000 | \$ 100 | \$50 | \$ 0 | \$50 | \$150 |
| 2 | 1,000 | 200 | 50 | 5 | 45 | 145 |
| 3 | 1,000 | 300 | 50 | 10 | 40 | 140 |
| 4 | 1,000 | 400 | 50 | 15 | 35 | 135 |
| 5 | 1,000 | 500 | 50 | 20 | 30 | 130 |
| 6 | 1,000 | 600 | 50 | 25 | 25 | 125 |
| 7 | 1,000 | 700 | 50 | 30 | 20 | 120 |
| 8 | 1,000 | 800 | 50 | 35 | 15 | 115 |
| 9 | 1,000 | 900 | 50 | 40 | 10 | 110 |
| 10 | 1,000 | 1,000 | 50 | 45 | 5 | 105 |
| 11 | 1,200 | 120 | 60 | 0 | 60 | 180 |
| 12 | 1,200 | 240 | 60 | 6 | 54 | 174 |
| 13 | 1,200 | 360 | 60 | 12 | 48 | 168 |
| 14 | 1,200 | 480 | 60 | 18 | 42 | 162 |
| 15 | 1,200 | 600 | 60 | 24 | 36 | 156 |
| 16 | 1,200 | 720 | 60 | 30 | 30 | 150 |
| 17 | 1,200 | 840 | 60 | 36 | 24 | 144 |
| 18 | 1,200 | 960 | 60 | 42 | 18 | 138 |
| 19 | 1,200 | 1,080 | 60 | 48 | 12 | 132 |
| 20 | 1,200 | 1,200 | 60 | 54 | 6 | 126 |

the utility for property consumed in service, and the duty of the Commission, guided by experience in rate making, is to spread this charge fairly over the years of life of the property.' " *United R. & E. Co. v. West*, 280 U.S. 243, P.U.R. 1930A, 225.

Two recent decisions subsequent to this ruling are as follows:

"Following binding precedent, the Commission based its computations for annual depreciation upon the value of utility property rather than cost thereof." *Re Chesapeake & Potomac Tel. Co. (Md. 1934)*,

1 P.U.R. (N.S.) 346, citing the above decision of the Supreme Court. "The annual depreciation allowance should be calculated on the present value since the utility is entitled to see that from earnings the value of the property invested is kept unimpaired so that at the end of any term of years the original investment remains as it was at the beginning, and that calls for expenditures equal to the cost of the worn out equipment at the time of replacement." *Yonkers R. Co.*, 266 App. Div. 542, (1935), 6 P.U.R. (N.S.) 1.

| Year | Rate base | Depreciation reserve | Interest on rate base | Interest on reserve | Net interest | Depreciation and net interest |
|------|-----------|----------------------|-----------------------|---------------------|--------------|-------------------------------|
| 1 | \$1,000 | \$ 100 | \$50 | \$ 0 | \$50 | \$150 |
| 2 | 1,000 | 200 | 50 | 5 | 45 | 145 |
| 3 | 1,000 | 300 | 50 | 10 | 40 | 140 |
| 4 | 1,000 | 400 | 50 | 15 | 35 | 135 |
| 5 | 1,000 | 500 | 50 | 20 | 30 | 130 |
| 6 | 1,000 | 600 | 50 | 25 | 25 | 125 |
| 7 | 1,000 | 700 | 50 | 30 | 20 | 120 |
| 8 | 1,000 | 800 | 50 | 35 | 15 | 115 |
| 9 | 1,000 | 900 | 50 | 40 | 10 | 110 |
| 10 | 1,000 | 1,000 | 50 | 45 | 5 | 105 |
| 11 | 800 | 260 | 40 | 10 | 30 | 90 |
| 12 | 800 | 320 | 40 | 13 | 27 | 87 |
| 13 | 800 | 380 | 40 | 16 | 24 | 84 |
| 14 | 800 | 440 | 40 | 19 | 21 | 81 |
| 15 | 800 | 500 | 40 | 22 | 18 | 78 |
| 16 | 800 | 560 | 40 | 25 | 15 | 75 |
| 17 | 800 | 620 | 40 | 28 | 12 | 72 |
| 18 | 800 | 680 | 40 | 31 | 9 | 69 |
| 19 | 800 | 740 | 40 | 34 | 6 | 66 |
| 20 | 800 | 800 | 40 | 37 | 3 | 63 |

To the authors it seems only reasonable and just that, when an existing plant has lived its useful life, there should be sufficient money in the reserve to enable the company to purchase a new plant that will render the same service. If at such a time it is possible to buy a new plant for less money and the interest earnings of the fund are considered as income, the customers are not injured but benefited. Conversely, if at such a time there is not sufficient money in the fund to purchase the new plant, money

from some outside source will have to be provided and the interest on this additional money will have to be paid by the customers.

To illustrate, let us assume a constantly increasing price of equipment to render the same service, the increase being at the rate of 2 per cent per year, a first or original cost of \$1,000 and a

| Year | Rate base | Depreciation reserve | Interest on rate base | Interest on reserve | Net interest | Depreciation and interest |
|------|-----------|----------------------|-----------------------|---------------------|--------------|---------------------------|
| 1 | \$1,000 | \$ 120 | \$50 | \$ 0 | \$50 | \$170 |
| 2 | 1,020 | 240 | 51 | 6 | 45 | 165 |
| 3 | 1,040 | 360 | 52 | 12 | 40 | 160 |
| 4 | 1,060 | 480 | 53 | 18 | 35 | 155 |
| 5 | 1,080 | 600 | 54 | 24 | 30 | 150 |
| 6 | 1,100 | 720 | 55 | 30 | 25 | 145 |
| 7 | 1,120 | 840 | 56 | 36 | 20 | 140 |
| 8 | 1,140 | 960 | 57 | 42 | 15 | 135 |
| 9 | 1,160 | 1,080 | 58 | 48 | 10 | 130 |
| 10 | 1,180 | 1,200 | 59 | 54 | 5 | 125 |
| 11 | 1,200 | 140 | 60 | 0 | 60 | 200 |
| 12 | 1,220 | 280 | 61 | 7 | 54 | 194 |
| 13 | 1,240 | 420 | 62 | 14 | 48 | 188 |
| 14 | 1,260 | 560 | 63 | 21 | 42 | 182 |
| 15 | 1,280 | 700 | 64 | 28 | 36 | 176 |
| 16 | 1,300 | 840 | 65 | 35 | 30 | 170 |
| 17 | 1,320 | 980 | 66 | 42 | 24 | 164 |
| 18 | 1,340 | 1,120 | 67 | 49 | 18 | 158 |
| 19 | 1,360 | 1,260 | 68 | 56 | 12 | 152 |
| 20 | 1,380 | 1,400 | 69 | 63 | 6 | 146 |

life of 10 years. The annual fixed charges are as shown in the table on p. 143.

Conversely, if the cost of new equipment to render the same service decreased at the rate of 2 per cent annually, the fixed charges would be as shown in the table on p. 144.

During the first 10 years the fixed charge (depreciation and interest) is the same for each corresponding year, but during the second 10-year period there is a radical difference. There is also a considerable change between the tenth and eleventh years in the first instance and not very much in the second instance.

Instead of assuming that the rate base is constant for each 10-year period, let us assume that it is increased 2 per cent each year in the first instance. The results are shown in the table on page 145.

It will be noted that the net interest the customers pay is the same as in the first instance but the depreciation is \$20 more each year. More nearly uniform fixed charges (interest and depreciation) would be highly desirable. Means of obtaining them will be discussed later on in this treatise.

Methods of Computing.—The two most common methods for the accumulation of the depreciation reserve are by the straight-line and the sinking-fund methods. There comes coupled with these some method of determining the expected life of each element of the property, rather than of the property as a whole. Life-expectancy tables have been prepared by different engineering organizations, which apply at the particular time and place for which they are devised. These tables form a basis for an estimate of the probable life of the article. However, an element of judgment must be used with these tables, and their use must also be tempered with experience of the particular company and similar utilities in the same district. It is also assumed that there shall be a close inspection of the condition of each element of the property as a whole for a check on the use of the life table.

The Straight-line Method.—In the straight-line method, illustrated at the beginning of this chapter and again at the end of the section immediately preceding this one, the wearing value is assumed to decrease uniformly each year during the life of the article. For a life of 10 years, the article has lost 60 per cent of its wearing value at the end of 6 years. Where all the depreciable units of a property have passed through one or more life cycles, it may be assumed that the age of all is distributed uniformly, from those just installed to those just ready to be replaced, so that the average age of each is 50 per cent of its useful life. This applies to nonchanging or nongrowing property and is known as the "50 per cent method." An example is that of railroad ties, some of which are replaced each year, the average time that they have been in place being one-half of the service life. For a growing business or when the cost of equipment and land is changing in unit price, the 50 per cent method cannot be used except

as a partial check. The straight-line method is the simplest and the one most often used. It assumes that the property depreciates on a uniform straight line from first cost to scrap value.¹

Sinking-fund Method.—According to the sinking-fund method of accumulating the depreciation reserve, the assumption is made that the amount in the reserve is the accrued depreciation of the property. It assumes that a sum is accumulated at compound interest each year at a specific rate of interest such that, at the end of the life of the unit under consideration, the amount in the reserve shall just equal the wearing value of the unit (cost less salvage). With this method, the present value of a unit having an expected life of 10 years will not be 60 per cent at the end of 4 years of use. Instead, the value will depend upon the particular rate of interest assumed. The annual charge is less by the sinking-fund method than by the straight-line method, and, since the interest earned on the fund is turned back into the fund, the company is allowed to earn upon the full reproduction cost of the property. The difference between the two methods is greatest for long-life units of the property such as are found in waterworks and gas-distribution systems.²

A comparison of the straight-line and the sinking-fund methods is shown by the following: Let r equal the annual interest rate and S the amount to be accumulated in the reserve at the end of n years, A being the number of dollars set aside each year and added to the fund at the end of the year. The amount S in the fund at the end of each year is shown by the following equations:

¹ *Lamar v. Intermountain R. L. & P. Co.* (Colo.), P.U.R. 1918B, 86; *Clark's Ferry Bridge Co.*, 291 U.S. 227, 78 L. ed. 767, 54 Sup. Ct. 427, (1934), 2 P.U.R. (N.S.) 225; affirming (Pa.), P.U.R. 1932C, 295, and 108 Pa. Super. 49, 165 Atl. 261, P.U.R. 1933D, 173; *Re Chesapeake & Potomac Tel. Co.* (Md. 1934), 1 P.U.R. (N.S.) 346; *New York Edison Co. v. Maltbie*, 271 N.Y. 103, 2 N.E. (2d) 277; *Re Tennessee E. P. Co.* (Tenn. 1937), 20 P.U.R. (N.S.) 17.

² *Re Wisconsin Tel. Co.* (Wis.), P.U.R. 1925D, 661; *Fuhrmann v. Cataract P. & Conduit Co.*, 3 P.S.C. N.Y. (2d Dist.) 656; *Lincoln v. Lincoln W. & L. Co.* (Ill.), P.U.R. 1917B, 1; *Re Pacific T. & T. Co.* (Ore.), P.U.R. 1922C, 248; *Pacific Gas & E. Co. v. San Francisco*, 265 U.S. 403, 65 L. ed. 1075; *Department Pub. Works v. Pacific County Bridge Co.* (Wash.), P.U.R. 1925D, 280; *Department Pub. Works v. Grays Harbor R. & L. Co.* (Wash. 1936), 12 P.U.R. (N.S.) 178; *Los Angeles v. Southern California Tel. Co.* (Cal. 1936), 14 P.U.R. (N.S.) 252.

1st year $S = A$.

2d year $S = A + A(1 + r)$.

3d year $S = A + A(1 + r) + A(1 + r)^2$.

n th year $S = A + A(1 + r) + A(1 + r)^2 + \dots + A(1 + r)^{n-1}$.

$$= A[1 + (1 + r) + (1 + r)^2 + \dots + (1 + r)^{n-1}].$$

$$S = \frac{A[(1 + r)^n - 1]}{(1 + r) - 1} \quad (S)$$

The amount to set aside each year to accumulate to a designated sum at the end of a specified period of years is obtained by solving for A

$$A = \frac{Sr}{(1 + r)^n - 1} \quad (A)$$

When r approaches zero, A approaches S/n which is the straight-line formula. The only distinction, therefore, between the straight-line and sinking-fund formulas is that the former is a special case of the latter.

From these two formulas the value of A , the amount set aside each year, or the value of S , the amount in the reserve, may be calculated so long as both r , the rate of interest, and n , the number of years, are known.

| Years | Interest rate, per cent | | | | | |
|-------|-------------------------|---------|---------|---------|---------------|---------|
| | 7 | 5 | 3 | 1 | $\frac{1}{2}$ | 0 |
| 1 | \$ 2.44 | \$ 3.02 | \$ 3.72 | \$ 4.53 | \$ 4.77 | \$ 5.00 |
| 2 | 5.10 | 6.20 | 7.45 | 9.15 | 9.80 | 10.00 |
| 4 | 10.80 | 12.95 | 15.50 | 18.50 | 19.20 | 20.00 |
| 6 | 17.50 | 20.50 | 24.10 | 27.80 | 29.00 | 30.00 |
| 8 | 25.40 | 28.80 | 33.10 | 37.50 | 38.80 | 40.00 |
| 10 | 33.70 | 37.80 | 42.80 | 46.50 | 49.00 | 50.00 |
| 12 | 43.60 | 48.00 | 52.80 | 56.00 | 58.80 | 60.00 |
| 14 | 55.00 | 59.00 | 63.80 | 67.70 | 69.00 | 70.00 |
| 16 | 68.00 | 71.50 | 75.00 | 78.30 | 79.20 | 80.00 |
| 18 | 83.10 | 85.00 | 87.00 | 88.90 | 89.40 | 90.00 |
| 20 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

The preceding table, giving the annual amount to be set aside and the accumulation in the fund, has been calculated by the use of formulas (A) and (S) for an assumed fund of \$100, for an assumed life of 20 years, and for various interest rates. The

value at the end of 1 year is the value of A to be set aside each year. The values in the last column at zero interest rate are those for the straight-line method.

In Fig. 1, the values for 7, 3, and 0 per cent are subtracted from \$100 and are plotted as ordinates against the number of years as abscissas. If the rate base is assumed to be the original cost less the amount in the depreciation reserve, the method used in plotting the curves, it is at once seen that the rate base is depend-

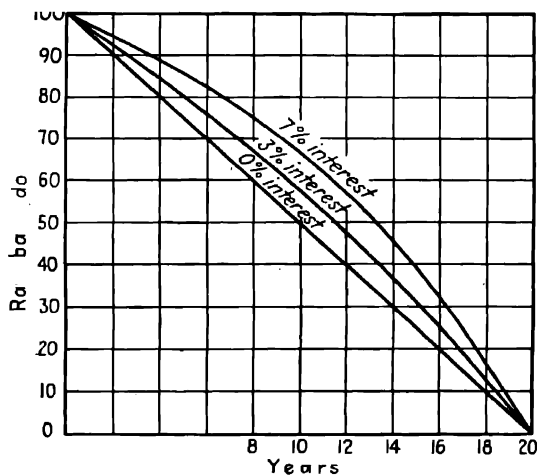


FIG. 1.

ent upon the interest that the depreciation reserve is capable of earning. How the interest rate can affect the natural deterioration or physical depreciation is indeed difficult to comprehend. That it may affect the economic value of a plant, especially one producing a certain product that can also be produced by another machine, is easy to comprehend. When interest rates on money are low, a new piece of equipment can probably be purchased to produce the same service, and the cost of such production (including interest) would be less. At the end of 6 years, according to this theory, the rate base would be 70 per cent on the straight-line basis and something greater than this with the sinking-fund basis, dependent upon the interest earned by the fund.

In the foregoing it was shown that the amount in the depreciation reserve is not a true index of the amount of depreciation. The reserve should be greater. If the reserve were in two parts, one representing that accumulated to offset *physical* depreciation and the other *functional* depreciation, the former would come closer to representing the physical depreciation. Even here it is impossible to be correct because the actual useful life, salvage value, and interest earned are not known in advance.

Inspection Method.—For this reason, and also as a check on the charges to this reserve, engineers and others familiar with the particular utility are called upon to examine it carefully and estimate the condition of all the component parts. As might be supposed, it is difficult to estimate the depreciation suffered by some types of equipment. Mains and ducts under streets cannot very well be examined. The condition of the steel in reinforced-concrete structures cannot readily be ascertained. Also, estimates made by one person may differ considerably from those made by another. When it is remembered that very few things in the whole field of operation are exact, criticism of the actual inspection method is not justified. It is one of the factors that enters into the finding of the value or rate base as the case may be.

The actual inspection may indicate that the charges for depreciation in the past have been excessive or insufficient and are justified from this angle alone since rates to be charged in the future are partly dependent upon the depreciation charges.¹

Use of Life Tables.—From experience in the operation of similar utilities, life tables have been prepared and published, giving the expected life of each element of the property. These tables give the average expected life for similar parts, salvage value of the

¹ *Bogart v. Wisconsin Tel. Co. (Wis.)*, P.U.R. 1916C, 1020; *Winona v. Wisconsin-Minnesota L. & P. Co.*, 276 Fed. 996, P.U.R. 1922C, 461; *Re Coast Gas Co. (N.J.)*, P.U.R. 1923A, 349; *Pacific T. & T. Co. v. Whitcomb (Wash.)*, P.U.R. 1926D, 815; *McCardle v. Indianapolis Water Co. (Ind.)*, P.U.R. 1927A, 15; *Re Cumberland & Allegheny Gas Co. (W. Va.)*, P.U.R. 1928B, 21; *Knoxville v. South Pittsburgh Water Co. (Pa.)*, P.U.R. 1928B, 207; *Long Island R. Co. (N.Y. Transit)*, P.U.R. 1928C, 750; *Wichita Gas Co. v. Public Service Comm. (Kan.)*, P.U.R. 1928D, 184; *Re Capital City Tel. Co. (Mo.)*, P.U.R. 1928D, 763; *Report of the Ohio Joint Committee on Valuation*, 3 P.S.R. 649; *Department Pub. Service v. Pacific P. & L. Co. (Wash. 1936)*, 13 P.U.R. (N.S.) 187; *Cheltenham-Abington Sewerage Co. v. Public Service Comm.*, 122 Pa. Super. 252, 186 Atl. 149 (1936), 15 P.U.R. (N.S.) 99.

part, and other information, from which a close estimate may be made for the preparation of the annual allowance needed in the sinking-fund and straight-line methods of establishing the reserve for depreciation, as well as the accrued depreciation and the condition percentage of the plant. These tables are compiled for average conditions and may or may not include the elements of functional depreciation in addition to that of physical depreciation. Unless the engineer is familiar with the method of compiling the tables, he is not able to modify them to fit a given plant. All the table can hope to do is to present average life expectancy in a well-maintained plant. It cannot fit all locations or conditions of maintenance. Soil conditions and quality of water may modify the life of underground pipes; quality of water and its treatment affects the life of boilers; weather conditions and the location of the plant may also modify its life to a great extent and make average figures in life tables of little value.¹ This was discussed by the Ohio Joint Committee in the following manner:

Unless the life tables are compiled with conditions similar to those surrounding the unit in question, they are practically useless as a basis of estimating the life of a unit. Frequently such tables are averages taken from records of units operating under widely diverse conditions; hence give no index as to the depreciation of a unit working under definite circumstances. Moreover, these tables are based upon units installed many years ago, and operating under conditions prevailing during that period, which are necessarily different from conditions under which similar units are operating today, or will be operated in the future. Moreover, such life tables are open to objections, because they necessarily fail accurately to measure: 1. The wear and tear which has actually taken place on the unit in question. Two machines of the same make and age in similar plants may have been called upon to perform widely different degrees of service, resulting in widely different amounts of wear and tear. 2. The standard of maintenance employed. Widely varying standards of maintenance will be adopted in different plants, and it is impossible to give proper consideration to variations in the preparation of life tables. 3. The element of adequacy. Such life table is an average and is not made with reference to any given community; it can furnish no guide to any influence which any element of

¹ Churchill v. Winthrop & E. L. & P. Co. (Me.), P.U.R. 1916F, 752; Re Lexington Water Co. (Ky.), P.U.R. 1928E, 323; Re Home Gas & E. Co. (Colo. 1934), 5 P.U.R. (N.S.) 107; Re Southern Bell Tel. Co. (La. 1935), 8 P.U.R. (N.S.) 1.

inadequacy from natural causes or from municipal regulation may have upon the date of replacement of the unit. 4. The element of obsolescence. Any effect which this element may have upon the total depreciation is much more nearly ascertainable by the appraiser at the time of making the valuation in the light of the state of the art at that particular time than by the use of life tables.—Report on Valuation of Ohio Joint Committee Representing all Classes of Utilities, in response to an order of the State Public Utilities Commission, 3 P.S.R. 649.

We believe that salvage estimates based on past experience are preferable to estimates based on the assumption that a uniform cost level will prevail. The percentage of salvage realized in the past is a definitely known amount. It may, and probably will, change in the future, either upward or downward. When such changes become manifest, they may be incorporated in the estimates and the annual depreciation rates modified accordingly. Under the group plan of depreciation accounting, service life estimates are influenced by the fact that retirements in the past have occurred at less than the average life of the property. It seems reasonable that if the service life of a plant is to be influenced by past retirements at less than the average life, the salvage estimate should give consideration to the salvage on past retirements. Furthermore, salvage percentages computed from past experience are based on actual facts rather than upon long range forecasts as to the salvage recovery of the property at some distant future date.—*Re Wisconsin Tel. Co. (Wis. 1935), 9 P.U.R. (N.S.) 1.*

For a telephone property the following allowances were made by the commission:

| Property | Service Life, years | Net salvage value | Depreciation rate, per cent |
|--------------------------------------|---------------------|-------------------|-----------------------------|
| Right of way..... | 50 | 0 | 2.0 |
| Buildings..... | 41 | 9 | 2.2 |
| Manual central office equipment..... | 19 | 5 | 5.0 |
| Dial central office equipment..... | 25 | 5 | 3.8 |
| Pole lines..... | 27 | (5) | 4.1 * |
| Aerial cable..... | 30 | 15 | 2.8 |
| Aerial wire..... | 30 | 25 | 3.0 † |
| Underground conduit..... | 60 | 0 | 1.7 |
| Underground cable..... | 40 | 20 | 2.0 |
| Submarine cable..... | 20 | 10 | 4.5 |

* Includes 0.2 per cent for temporary facilities.

† Includes 0.5 per cent for temporary facilities.

Parenthesis denotes negative figures.

Combined Method.—It is more common to use the inspection method in combination with other methods of determination of the accrued depreciation and the depreciation allowance for a utility. The use of theoretical methods, either straight-line or sinking-fund calculations, is not representative of the actual condition percentage of the property. A careful inspection method serves as a valuable check on any of these methods. On the other hand, theoretical methods also serve as a check on the inspection method. Two or more methods are generally used for each case under consideration.¹

Annual Charge for Depreciation.—The annual depreciation allowance should be the amount determined as the average annual amount which will keep the depreciation reserve accumulating at a sufficient rate to care for withdrawals for physical depreciation and that part of the functional depreciation which has been determined as chargeable to the reserve. The amount is in the nature of an estimate checked by the application of life tables and inspection to the depreciable property of the utility. It must increase with the growth of the value of the utility property and should be set aside only in years when there is a surplus. This allowance for depreciation must be set aside before any dividends have been declared or paid by the company.²

Combined Depreciation and Maintenance.—In the past, some utilities have made a combined allowance for maintenance and depreciation. Such practice is not approved by most commissions, for maintenance should be an annual charge depending upon the necessities of the particular year in question, whereas

¹ *Bogart v. Wisconsin Tel. Co.* (Wis.), P.U.R. 1916C, 1020; *Re Helena L. & R. Co.* (Mont.), P.U.R. 1920D, 668; *Re Northwestern Bell Tel. Co.* (Minn.), P.U.R. 1922C, 762; *Arkansas Water Co. v. Little Rock* (Ark.), P.U.R. 1924C, 74; *Re Boone County Tel. Co.* (Ark. 1934), 4 P.U.R. (N.S.) 121.

² *Stadtlander v. New York Edison Co.* (N.Y.), P.U.R. 1915B, 685; *Re Santa Barbara Tel. Co.* (Cal.), P.U.R. 1920E, 585; *Smith v. Illinois Bell Tel. Co.*, 75 L. ed. 255, 51 Sup. Ct. 65, P.U.R. 1931A, 1; *San Jose v. Pacific T. & T. Co.*, 3 Cal. R.C.R. 720; *Re Haverhill*, 28 Mass G. & E.L. Co. mm., 41; *Re Great Falls Gas Co.* (Mont.), P.U.R. 1928E, 804; *Worcester E. L. Co. v. Attwill*, 23 F. (2d) 891, P.U.R. 1929A, 4; *Lincoln Gas & E. L. Co. v. Lincoln*, 223 U.S. 349, Feb. 19, 1912; *Re Racine Water Co.* (Wis.), P.U.R. 1917D, 277; *Antioch v. Pacific Gas & E. Co.* 5 Cal. R.C.R. 19; *Re Hartford Water Co.* (Conn.), P.U.R. 1930C, 22.

the depreciation annual allowance is uniform in order to provide for future replacements.¹

¹ People ex rel. Jamaica Water Supply Co. v. Tax Comm'rs, 128 App. Div. 13, 112 N.Y. Supp. 392, Sept. 17, 1908, 196 N.Y. 39, 89 N.E. 581, Oct. 19, 1909; Re Milwaukee E. R. & L. Co. (Wis.), P.U.R. 1918E, 1; Ann Arbor R. Co. v. Fellows, 236 Fed. 387, P.U.R. 1917B, 523; Re Southern Pacific R. Co. (Nev.), P.U.R. 1920F, 725.

CHAPTER XI

TREATMENT OF ACCRUED DEPRECIATION

Relation to Depreciation Reserve Balance.—As a business continues to operate, items of short life cycle are soon replaced; those of long expected age deteriorate more slowly but ultimately approach the time when they must be replaced. The amount of depreciation in the property for these long-life items grows more and more each year until this accrual meets the wearing value of the item, and then, theoretically, the part should be removed. The amount in the depreciation reserve should increase at the same rate as this accrued depreciation, so that the two should balance at all times. Since it is impossible to foretell with accuracy the exact life expectancy of each element, even with the aid of past-experience records of the company, it is seldom that the amount in the depreciation reserve may be taken as the amount of the accrued depreciation in the property. One element that makes this especially difficult to balance is the amount to be allowed for functional depreciation. The amount in the reserve may be either too large or too small, and few commissions will approve the deduction of the balance in the reserve rather than to make a determination of the accrued depreciation by some more accurate engineering method.

It was shown previously that the amount accumulated in the depreciation reserve is determined from the following formula:

$$S_n = \frac{A[(1 + r)^n - 1]}{r}$$

where S_n is the accumulated sum at the end of n years with interest being earned at the rate of r per year and A is the annual payment. At the end of the useful life, the sum S should be equal to the original cost C_0 less the salvage value X . If n is the number of years of useful life,

$$C_0 - X = S_n.$$

The annual payment to the depreciation fund is expressed by the equation

$$A = \frac{(C_0 - X)r}{(1 + r)^n - 1}.$$

It seems rational to assume that the total expense, *i.e.*, operating expense, interest, and depreciation, should not be less with older equipment than with new. In other words, if a plant has an assumed useful life of 20 years, the total expense during the last 10 years should not be less than that during the first 10 years unless the operating expense has changed. Or, assuming two identical plants, one of which is 4 years old and the other 8, it does not seem reasonable to suppose that the older one should have a lesser total expense than the newer one.

When the interest rate on the reserve is the same as the interest rate on the rate base, which may be assumed when the reserve is invested in additions to property, the entire expense is represented by the following equation, where E is operating expense:

$$\begin{aligned} B &= rC_0 + \frac{r(C_0 - X)}{(1 + r)^n - 1} + E_0 \\ &= \frac{rC_0(1 + r)^n}{(1 + r)^n - 1} - \frac{rX}{(1 + r)^n - 1} + E_0. \end{aligned}$$

After q years have passed and the new rate base is assumed to be the original cost C_0 less the amount in the reserve, S_q , the entire expense, is represented by

$$B_q = r(C_0 - S_q) + \frac{r(C_0 - S_q - X)}{(1 + r)^{n-q} - 1} + E_q;$$

so

$$B_q = \frac{r(C_0 - S_q)(1 + r)^{n-q}}{(1 + r)^{n-q} - 1} - \frac{rX}{(1 + r)^{n-q} - 1} + E_q.$$

But

$$C_0 - S_q = C_0 - (C_0 - X) \left[\frac{(1 + r)^q - 1}{(1 + r)^n - 1} \right],$$

therefore,

$$B_q = rC_0 \left[\frac{(1 + r)^n}{(1 + r)^n - 1} \right] - \frac{rX}{(1 + r)^n - 1} + E_q.$$

The value of B_q is the same as B ; so one may conclude that, when the rate of interest on the reserve and rate base are alike, the total expense including interest on rate base, depreciation annuity, and operating expenses is the same regardless of whether the rate base is the original cost or the original cost less the amount in the reserve. With these assumptions, the total expense of the 8-year old plant would be the same as the 4-year one.¹

By accrued depreciation is meant the difference between the value of the properties new and their present value. It includes the total actual loss in value due to both physical and functional factors. It includes physical deterioration occasioned by wear and tear and the action of the elements, and functional deterioration due to obsolescence, inadequacy, changes in types of equipment and the requirements of public authority. The depreciation concept embraces the loss in value due to exhausted service life.—*Re Southwestern Bell Tel. Co. (Okla. 1935)*, 9 P.U.R. (N.S.) 113.

Efficiency of Service Theory.—One of the arguments against the deduction of accrued depreciation from the reproduction cost new to obtain the present value has been the so-called “efficiency of service theory.” It is argued that a plant which is rendering and can render 100 per cent service as efficiently as a new plant is as valuable as a new plant. This theory does not take into account the impending depreciation of the property due to all causes. Although the piece is as good as new or is rendering efficient service, it is approaching the time when it must be replaced owing to physical or functional causes. This theory

¹ *Re Chesapeake & Potomac Tel. Co. (Md.)*, P.U.R. 1916C, 925; *Re Tennessee Eastern E. Co. (Tenn.)*, P.U.R. 1926E, 378; *New York Tel. Co. v. Prendergast*, 26 F. (2d) 54, P.U.R. 1930B, 35; *Chesapeake & Potomac Tel. Co. of Baltimore v. West*, 7 F. Supp. 214 (1934), 3 P.U.R. (N.S.) 241; *Re Scranton-Spring Brook Water Supply Co.*, 105 Pa. 203, 160 Atl. 230, P.U.R. 1932C, 471; *Re Alabama P. Co. (Ala.)*, P.U.R. 1933C, 467; *Milwaukee v. Wisconsin R. Comm.*, 169 Wis. 559, 173 N.W. 329, P.U.R. 1920B, 976; *Kings County L. Co. v. Prendergast*, 7 F. (2d) 192, P.U.R. 1925C, 705; *Re Home Gas & E. Co. (Colo.)*, 1934, 5 P.U.R. (N.S.) 107; *Re City of Milwaukee (Wis.)*, P.U.R. 1927B, 229; Whitten-Willcox, *Valuation of Public Service Corporations*, 2d ed., 1928, p. 1720; *Public Util. Comm. v. New York Tel. Co.*, 271 U.S. 23, 31, 70 L. ed. 808, 46 Sup. Ct. 363, P.U.R. 1926C, 740; *Georgia R. & P. Co. v. Georgia R. Comm.*, 262 U.S. 625, 67 L. ed. 1144, 43 Sup. Ct. 680, P.U.R. 1925D, 1.

has been rejected in most cases.¹ It was well discussed in the Metropolitan Street Railway Case by the New York Commission, as follows:

Suppose that we assume that a street railway system that is not new does serve the public as efficiently as when new, that is, earns as much, and that replacements will be made out of current income. Does it follow that the property is as valuable as when new, and that its fair value is its original cost? Present efficiency should not be confused with value, and the character of service being rendered does not determine value. It is rather the amount of service remaining or the length of term that a thing will continue to operate efficiently. For example, take a street car, which, we will say with ordinary usage and good management, will last twenty years. Assume that it has been operated ten years and kept in first class condition, so that it is giving good service. Nevertheless, that car is not worth as much to a purchaser or to a manager as a car that is one year old, and largely for the reason that a car that is ten years old has a remaining life of only ten years, and that in those ten years the manager must accumulate a sufficient fund out of earnings to replace the car. In the case of the one year old car, he has nineteen years to accumulate a fund equal to its cost; in the case of the ten year old car, only ten years. To accept the view of the applicants requires that one believe that property has full value up to the moment it disappears, and then instantly drops to zero. Further, if parts of an undertaking deteriorate and decrease in value the whole undertaking will not have a value equal to its original cost when all parts are new. Replacement of parts (that is, cars, track, boilers, engines, etc.), as they need replacement will not keep the property as valuable as when new unless the parts are all replaced at once, which is practically impossible. The only way to determine what is the value of the whole

¹ Re Illinois Terminal R. Co. (Ill.), P.U.R. 1917B, 494; Re Freeport & Nassau S. L. Co. (N.Y.), P.U.R. 1924A, 96; Re Chesapeake & Potomac Tel. Co. (Va.), P.U.R. 1926E, 483; Re Great Northern Util. Co. (Mont.), P.U.R. 1929B, 176; Public Service Comm. v. Southern Bell T. & T. Co. (La. 1935), 8 P.U.R. (N.S.) 1; Re Upstate Tel. Corp. (N.Y. 1936), 13 P.U.R. (N.S.) 134; Re Southwestern Bell Tel. Co. (Okla. 1935), 9 P.U.R. (N.S.) 113; Frackville Taxpayers Ass'n v. Frackville Sewerage Co. (Pa. 1934), 7 P.U.R. (N.S.) 515; Alexandria Water Co. v. Alexandria (Va. Sup. Ct. App. 1934), 7 P.U.R. (N.S.) 53; State ex rel. Oregon & Washington Water Supply Co. v. Department Pub. Works (Wash. Super. Ct. 1935), 10 P.U.R. (N.S.) 286; Department Pub. Service v. Pacific P. & L. Co. (Wash. 1936), 13 P.U.R. (N.S.) 187; Marinette v. City Water Co. (Wis. 1934), 6 P.U.R. (N.S.) 501; Re Wisconsin Tel. Co. (Wis. 1936), 13 P.U.R. (N.S.) 224; Torrington v. Torrington E. Co. (Conn. 1935), 10 P.U.R. (N.S.) 353.

undertaking is to examine its constituent parts and determine their value having regard to all the factors.—*Re Metropolitan S. R. Co.*, 3 P.S.C. N.Y. (1st Dist.) 113.

The work was done by highly trained and competent men, and we have not found a word of criticism in the transcript or brief as to the fairness with which their adopted method was applied. The method was to ascertain per cent of service condition as compared to condition new. They did not determine that condition by vague estimates of an actuarial nature but by technical inspection and tests. They also consider "nonphysical" items such as inadequacy, requirements of public authorities, and obsolescence when those items presently existed and could be specifically identified.—*Pacific T. & T. Co. v. Thomas* (Ore. 1936), 13 P.U.R. (N.S.) 337.

To Be Considered for Present Value.—In the majority of rate cases some amount for depreciation has been subtracted from the cost new to arrive at the rate base. In starting a new enterprise, the cost of maintenance and repairs is much less for the first few years than afterward. In many cases, part of the original invested capital has been returned to the owners in one form or another. In some cases this comes about through direct payments of dividends. In other cases the surplus, or the amount that would naturally accrue to the depreciation reserve, is invested in extensions of the property, and perhaps stock dividends are issued to cover this increase in investment. In any case, the owners have a right to earn on an amount somewhat less than the cost new. How much less must be determined in each case from a study of the history of the company and from its books.

The *Smyth v. Ames* case states that the utility has a right to a rate base where *present value* is considered. What is really meant by present value has been difficult to determine in some cases. If present value means market value not based on earning power of the utility, then depreciation must be deducted from the first cost to secure present value. However, if investment is the background of the determination, then that which has neither been furnished by the company toward the rate base nor returned to the investors in any form over and above the regular approved earnings or net return should be deducted from the prudent investment or from the reproduction cost new of the property. These issues are confused in some of the decisions of the regulatory bodies and the courts.

In equipment that is used for the production of facilities that can be produced by other equipment, the worth of such existing equipment can be approximated by comparison with that of such other equipment. In other words, if the existing equipment can be replaced with a new type having lower production costs, what is the present equipment worth? It was shown previously that, when the depreciation reserve accumulates at the same interest rate as the rate allowed on the rate base, the same over-all cost results whether the rate base is the original cost or whether the original cost is diminished by the accumulation in the reserve. If an existing machine produces M units annually, the cost per unit is

$$\left[rC + \frac{r(C - X)}{(1 + r)^n - 1} + E \right] \div M,$$

where C is the original cost;

X is the salvage value;

r is the interest rate;

E is the operating expense;

n is the number of years of life; and

M is the number of units produced annually.

By applying the subscript 1 to indicate a new or substitute plant, the unit production cost of such new plant is

$$\left[rC_1 + \frac{r(C_1 - X_1)}{(1 + r)^n - 1} + E_1 \right] \div M_1.$$

The economic value of the old plant is to be found by comparing it with the new, and the point of equality is such that the unit production cost will be the same for each. Replacing C by the unknown economic value represented by V , we can set up the following equation:

$$\frac{rV + \frac{r(V - X)}{(1 + r)^n - 1} + E}{M} = \frac{rC_1 + \frac{r(C_1 - X_1)}{(1 + r)^n - 1} + E_1}{M_1}.$$

The number of years of natural life n has been assumed the same for each. This equation permits one to solve for V as follows:

$$V = \frac{(1 + r)^n - 1}{r(1 + r)^n} \left\{ \frac{rX}{(1 + r)^n - 1} - E + \frac{M}{M_1} \left(rC_1 \left[\frac{(1 + r)^n}{(1 + r)^n - 1} \right] - \frac{rX_1}{(1 + r)^n - 1} + E_1 \right) \right\}$$

which reduces to

$$V = \frac{MC_1}{M_1} + \left(X - \frac{MX_1}{M_1} \right) \frac{1}{(1+r)^n} - \frac{(1+r)^n - 1}{r(1+r)^n} \left(E - \frac{M}{M_1} E_1 \right).$$

This equation gives the economic value of an existing machine in terms of a new substitute machine. If the new one is to produce the same number of units annually as the old, the economic value of the old becomes

$$V = C_1 + \frac{X - X_1}{(1+r)^n} - \frac{E - E_1}{r + \frac{r}{(1+r)^n - 1}}.$$

If the difference in salvage is ignored, the value V is equal to the cost of a substitute machine C_1 less the saving in operating expenses $(E - E_1)$ capitalized at the interest rate r plus the depreciation annuity rate

$$\frac{r}{(1+r)^n - 1}.$$

If the progress made in increasing the efficiency of production equipment during the past is an indication of what one may expect in the future, it would be possible to estimate the functional depreciation by means of the preceding formula.¹

¹ Louisiana R. Comm. v. Cumberland T. & T. Co., 212 U.S. 414, 53 L. ed. 577, 29 Sup. Ct. 357, Feb. 23, 1909; Knoxville v. Knoxville Water Co., 212 U.S. 1, 53 L. ed. 371, 29 Sup. Ct. 148; Rochester v. New York State R. Co., 127 Misc. 766, 217 N.Y. Supp. 452; Re Stockton Terminal & Eastern R. Co., 2 Cal. R.C.R. 777; Minnesota Rate Cases (Simpson v. Shepard), 230 U.S. 352, 57 L. ed. 1511, 33 Sup. Ct. 729, June 9, 1913; Des Moines Gas Co. v. Des Moines, 199 Fed. 204; affirmed 238 U.S. 153; Milwaukee v. Wisconsin R. Comm., 169 Wis. 559, 173 N.W. 329, P.U.R. 1920B, 976; Re Helena L. & R. Co. (Mont.), P.U.R. 1920D, 668; Re Winnipeg E. R. Co. (Manitoba), P.U.R. 1921C, 496; Re New York R. Co. (N.Y. 2d), P.U.R. 1921C, 496; Re Platte County Ind. Tel. Co. (Neb.), P.U.R. 1922D, 303; Re Rockford Gas L. Co. (Ill.), P.U.R. 1922E, 756; Seattle v. Pacific T. & T. Co. (Wash.), P.U.R. 1923D, 113; Charleston v. Public Service Comm., 95 W. Va. 91, 120 S.E. 398, P.U.R. 1924B, 357; reversing Re United Fuel Gas Co. (W. Va.), P.U.R. 1924A, 357; Los Angeles Gas & E. Corp., 289 U.S. 287, 77 L. ed. 1180, 53 Sup. Ct. 637, P.U.R. 1933C, 229, Consolidated Tel. Co. v. Georgia Pub. Service Comm. (1934), 2 P.U.R. (n.s.) 454.

Where the reserve for depreciation has been established on the sinking-fund basis, the utility does not earn on this fund and it is customary not to deduct the depreciation in such cases. Where the reserve is established on the straight-line basis and where this fund has been invested in extensions and betterments to the plant, the stock and other security holders have not furnished this particular capital. In this case the ruling is generally to deduct the depreciation from the reproduction cost new or the prudent investment, to secure the present value or the rate base of the property. This point of view is on the investment basis and holds that the investors are entitled to earn only on that which they have furnished to the property in the form of the rate base.¹

Treatment in Absence of Depreciation Reserve.—The question of the proper method of considering accrued depreciation where the utility has not set aside any depreciation reserve or where the reserve is entirely inadequate comes up for consideration in three general classes of cases: (1) where the company has been able to earn a sufficient sum to set aside for such a reserve, but has either put the income into surplus or else has paid it out in dividends; (2) where the company has not earned a sufficient amount to set aside as a reserve on account of its own fault, either in methods of operation or in neglecting to ask for sufficient rates; and (3) where the company has been unable to earn a sufficient amount because of the rates fixed by the regulatory body. These three cases will be considered separately.

Where Sum Has Been Earned.—Where the sum sufficient for setting aside a depreciation reserve has been earned during the period of operation and no reserve has been set aside, the attitude of the regulatory bodies is that this sum must have been returned to the security owners as extra dividends. This procedure is equivalent to having part of the original investment returned to the investors. The ruling is almost unanimous in such cases that the estimated accrued depreciation in the plant should be deducted from the reproduction cost new to determine the rate base or present value on which the company may earn in the future. This is not in conflict with the equations developed, for

¹ Re Berlin E. L. Co., 3 N.H.P.S.C.R. 174, Aug. 30, 1913; Spurr on Guiding Principles of Rate Regulation, Vol. II, p. 405.

they were developed on the assumption that the depreciation reserve was not returned to the stockholders.¹

Where Sum Has Not Been Earned Due to Fault of Company.—Where the sum has not been earned owing to the fault of the company, the usual attitude of the regulatory bodies is that the utility has a right to rates that would have provided such a reserve. If it has neglected to ask for such rates, the investors should be the ones to stand the loss, rather than to pass on such a loss to the customers, either in the form of a rate base equal to the full undepreciated value or in the form of rates sufficient to establish the depreciation reserve in the future. This feature was decided by the Supreme Court as follows:

If the company fails to perform this plain duty and to exact sufficient returns to keep the investment unimpaired, whether this is the result of unwarranted dividends upon over issues of securities, or of omission to exact proper prices for the output, the fault is its own. When, therefore, a public regulation of its prices comes under consideration, the true value of the property then employed for the purpose of earning a return cannot be enhanced by a consideration of the errors in management which have been committed in the past.—*Knoxville v. Knoxville Water Co.*, 212 U.S. 1, 53 L. ed. 371, 29 Sup. Ct. 149.

There is not so much difference among the rates customers will pay as one might suppose; the difference largely results from the change in the length of useful life. At the beginning of this chapter, it was shown that, if the depreciation reserve was on the sinking-fund basis, accruing with an interest rate equal to the rate of return on the rate base, the fixed charges (interest on rate base plus depreciation annuity rate) would be the same regardless of whether the rate base was the original cost or the original cost reduced by the amount in the reserve. The useful life may have been estimated at 25 years at the beginning of the enterprise, but after a lapse of time it may be discovered that the 25-year period is too short and that 35 years would be more nearly correct.

¹ Re Berlin E. L. Co., 3 N.H.P.S.C.R. 174, Aug. 30, 1913; *Hill v. Antigo Water Co.*, 3 Wis. R.C.R. 623; Re Chesapeake & Potomac Tel. Co. (Md.), P.U.R. 1916C, 925; *Milton & Milton Junction Tel. Co. (Wis.)*, P.U.R. 1920C, 110; Re Great Falls Gas Co. (Mont.), P.U.R. 1922D, 385; *Hoffman v. Elmira Water L. & R. Co. (N.Y. 2d Dist.)*, P.U.R. 1922D, 266; Re Queens Borough Gas & E. Co., 2 P.S.C. N.Y. (1st Dist.) 544, June 23, 1911; Re Helena L. H. & P. Co. (Mont.), P.U.R. 1920D, 668.

The stockholders will of course be out of pocket if the useful life turns out to be less than was estimated in the first place. What the situation is at the time depends upon all factors that affect the reserve such as interest and assumed useful life.

Where Sum Has Not Been Earned Owing to Fault of Commission.—Where the failure to earn a sufficient amount to pay all operating expenses and to set aside a depreciation reserve is on account of rates fixed by the commission, it would be unfair to require the utility to stand future losses by deduction of the accrued depreciation from the reproduction cost new in order to secure the rate base. The commission should fix more liberal rates in the future which will take care of this situation, provided that the utility is able to earn this amount and the rates are not beyond the reasonable value of the service to the consumers.¹

Functional Depreciation and Acts of God.—Since functional depreciation results from changed conditions in the surroundings which render the structure ill-adapted or inadequate for its work and, since the hazard of obsolescence of equipment is like the fire hazard, the company should maintain a reserve fund to guard against losses of this nature, the amount of the reserve depending upon the type of utility and upon past experience. This fund must be maintained out of earnings, so that the old article may be written off when replaced and the value of the new article credited to the capital account to keep the investment intact. This method applies to ordinary functional depreciation. As a general consideration, functional depreciation must be borne by the investor rather than by the consumer, and the rate of return should be made large enough to cover this risk. However, in special cases, functional depreciation when caused by passage of laws or ordinances, agreements with the public, and other well-established causes may require an annual charge in the rates until the particular part of the system is amortized. In all cases, functional depreciation should be deducted from replacement cost new before determining the rate base. The allowance for hypothetical functional depreciation in shortening the actual life of the elements is difficult to apply, for a new invention that

¹ Re Manchester & N.S.R. Co. (N.H.), P.U.R. 1917A, 255; Re Medford Gas Co. (N.J.), P.U.R. 1919E, 707; Re Ocean City Sewer Co. (N.J.), P.U.R. 1918E, 677; Re Clayton-Glassboro Water Co. (N.J.), P.U.R. 1922E, 223; Re Gardiner L. & Water Co. (Mont.), P.U.R. 1920D, 821.

would make an old element obsolete would also render any newly installed element obsolete.¹

The effect of the development of Federal hydroelectric projects in competition with present systems was discussed by the Washington Commission as follows:

We refer specifically to the extensive Federal hydro development at Bonneville on the Columbia river. The large generating plant is rapidly nearing completion and because of its strategic location it is bound to have a material effect upon the operations of respondent and other electric utilities operating within reasonable transmission distance therefrom. Since a large portion of the cost of this huge hydro development will be allocated to navigation and possibly flood control the cost of the energy generation will be low as compared with similar generation costs of privately operated hydro and steam plants. In a report recently submitted by the state planning commission of Oregon to the governor of that state an extensive transmission system reaching many points in both Washington and Oregon, including one of the largest districts served by this utility, is outlined. These factors will in the course of time exert a tremendous influence not only upon rates for service but also upon the retirement date of certain items of property now operated by private utilities. For these reasons we feel that our allowance for annual depreciation expense should be increased to the extent of enabling the utility to set up an additional amount in its retirement reserve properly to care for this contingency.—*Department Pub. Service v. Pacific P. & L. Co.* (Wash. 1936), 13 P.U.R. (n.s.) 187.

Depletion and Depreciation of Natural-gas Properties.—There are two distinct elements to be considered in the depreciation of a natural-gas property. The first of these is that of the actual depreciation of the physical property represented by pipe lines, casing of wells, and other actual physical elements of value.

¹ *Knoxville v. Knoxville Water Co.*, 212 U.S. 1, 53 L. ed. 371, 29 Sup. Ct. 148; *Smyth v. Ames*, 169 U.S. 466; *San Diego Land & Township v. Jasper*, 189 U.S. 439; *Willcox v. Consolidated Gas Co.* 212 U.S. 19; *Minnesota Rate Cases*, 230 U.S. 352; *Kansas City Southern R. Co. v. U.S.*, 204 Fed. 641; 231 U.S. 423; *Re Los Angeles Gas & E. Co. (Cal.)*, P.U.R. 1927C, 35; *West v. United R. & E. Co. of Baltimore, (Md.)*, P.U.R. 1928D, 144; *Re Ohio Bell Tel. Co. (Ohio 1934)*, 2 P.U.R. (n.s.) 113; *Re Home Gas & E. Co. (Colo. 1934)*, 5 P.U.R. (n.s.) 107; *Re Chesapeake & Potomac Tel. Co. (Md.)*, P.U.R. 1916C, 925; *Re Racine Water Co. (Wis.)*, P.U.R. 1917D, 277; *Re Bell Tel. Co. (Pa.)*, P.U.R. 1933B, 341; *Re New England Tel. Co. (N.H.)*, P.U.R. 1926E, 187.

These items are depreciated in the same manner as are similar items of property of manufactured-gas companies.

The second form of depreciation which differs from that of other properties is that of depletion of the gas supply in the acreage from which the company draws its supply. This depletion is sometimes difficult to measure by exact methods or to estimate from experience. It cannot be gauged from a single physical inspection of the property, and it cannot be secured from age and life tables. One method of measurement is that of the use of the loss of pressure of the gas and the application of Boyle's law relating to pressure and volume in an enclosed container. In order to use this law, the actual amount of gas removed from a given gas pocket or volume must be known and the pressure of the gas (rock pressure) before and after its removal. Where the acreage supplies several companies and the distinct boundary of each gas pocket is not known, Boyle's law cannot be applied in the calculation.

Several recent decisions regarding depletion of natural-gas properties are given in the following:

There is evidence that the method of computation adopted by the Commission is in accordance with the accepted practice of mining engineers. The practice is to obtain the rock pressure at the initial flow of the gas and again at the time of the appraisal, and to measure the depreciation by the reduction thus disclosed. The wells and their equipment have only a scrap value after the exhaustion of the gas, and contents and containers thus depreciate together.—*Dayton P. & L. Co. v. Ohio Pub. Util. Comm.*, 292 U.S. 290, 78 L. ed. 1261, 54 Sup. Ct. 647 (1934), 3 P.U.R. (N.S.) 279.

The supreme court of Ohio excluded an allowance to amortize the value of the leaseholds, as allowed by the commission, on the basis of the fact that the statutes of Ohio did not say anything about an allowance for depletion of the gas. Mr. Justice Cardozo of the United States Supreme Court rendered the following decision:

We may assume in submission to the holding of that court that the amortization allowance must be rejected if the rate making process is to conform to the rule prescribed by statute, irrespective of any other. That assumption being made, the conclusion does not follow that the statutory procedure may set at naught restrictions imposed upon

the state and upon all governmental organs by the Constitution of the Nation.

To withhold from the public utility the privilege of including a depletion allowance among its operating expenses, while confining it to a return of 6.5 per cent upon the value of its wasting assets, is to take its property away from it without due process of law, at least where the waste is inevitable and rapid. The Commission has found that the life expectancy of the operated gas fields is only three years and two months. If that holding is correct, the owner of the exhausted fields will find itself in a brief time with wells and leases that are worthless and with no opportunity in the interval to protect itself against the impending danger of exhaustion. Plainly the state must either surrender the power to limit the return or else concede to the business a compensating privilege to preserve its capital intact.—*Columbus Gas & Fuel Co. v. Ohio Pub. Util. Comm.*, 292 U.S. 398, 78 L. ed. 1327, 54 Sup. Ct. 647 (1934), 4 P.U.R. (N.S.) 152.

In a later decision the Ohio Commission held that 10 per cent of the value of leases, wells, and equipment was a proper allowance for annual depletion reserve of natural-gas wells.¹

Consideration of Overheads.—The question of the allowance for depreciation of overheads can be divided into two general classes. The first of these includes those general overheads which will continue with the rate base and which are sometimes called "general overheads." The second class consists of those items which will have to be expended each time that the piece is replaced and which would be depreciated with the part that is to be replaced. The first of these classes of overheads should not be depreciated, but the second should be depreciated at the same rate as the particular class of property to which it is attached.² This subject has been discussed as follows:

The real test as to whether there is or can be any depreciation of such values will depend upon whether in the replacement of any unit the overhead cost must be incurred. Subjecting the overhead and pre-

¹ *Wheeling v. Natural Gas Co.* (W. Va. 1934), 5 P.U.R. (N.S.) 471; *Re Logan Gas Co.* (Ohio 1935), 7 P.U.R. (N.S.) 342; *East Ohio Gas Co. v. Cleveland* (Ohio, 1934), 4 P.U.R. (N.S.) 433.

² *Re Metropolitan S. R. Co.* 3 P.S.C. N.Y. (1st Dist.) 113; *Re Withington*, (Mass.), P.U.R. 1917B, 410; *Re Helena L. & R. Co.* (Mont.), P.U.R. 1920D, 668; *Galveston v. Galveston E. Co.*, 258 U.S. 388, 66 L. ed. 678, 42 Sup. Ct. 351, P.U.R. 1922D, 159; *Re Detroit United R. Co.* (Mich.), P.U.R. 1923E, 282; *Re Capital City Water Co.* (Mo.), P.U.R. 1928C, 436.

liminary costs to this test, it is found that the costs of preliminary investigation, organization, financing, legal, administration, general engineering, interest, insurance, taxes during construction do not, upon the replacement of a unit, need to be reincurred to any extent. Therefore, it is the opinion of the Committee, that the depreciation of these values if any exists at a given time, is so small that it is impracticable to compute it, and that the utilities are justified in ignoring it in making up their inventories.—Report of Ohio Joint Committee, 3 P.S.R. 649, 655.

Effect of Depreciation Errors on Rates Charged.—From the foregoing it is apparent that, because of the uncertainty of the future, considerable error may be made in the estimates of useful life, interest earned, etc., which in turn affect the charges made for the service. Although it is impracticable to discuss the effects of errors in judgment under all methods of depreciation accounting employed, it may be advisable to discuss them for one method, *viz.*, the sinking-fund method.

On the assumption that the income from service rendered must be no less than cost and equal to it over an extended period, the following equations show the relationship. Using the same letters as used before to represent the same quantities and in addition letting I represent the income to the utility, we have

$$\begin{aligned} I &= rC + \frac{r(C - X)}{(1 + r)^n - 1} + E \\ &= rC \left[1 + \frac{1}{(1 + r)^n - 1} \right] - \frac{rX}{(1 + r)^n - 1} + E. \end{aligned}$$

In order to place the total expense in comparative terms, let it be assumed that the operating expense E is equal to some multiple of the return rC , *i.e.*, let $E = hrC$ and $X = jC$.

Then

$$\begin{aligned} I &= \frac{rC(1 + r)^n}{(1 + r)^n - 1} - \frac{rjC}{(1 + r)^n - 1} + hrC \\ &= rC \left\{ \frac{(1 + r)^n + [(1 + r)^n - 1]h - j}{(1 + r)^n - 1} \right\} \\ &= rCF. \end{aligned}$$

Several values of F are shown in Table II. With reference to the table, it will be seen that, when the operating expenses are

the same amount as the return ($h = 1$), a mistake in assuming n to be 30 years instead of 25 years would mean that the income would be 95.4 per cent of what it should have been. If the operating expenses are twice as much as the return ($h = 2$), an assumed life of 40 years would mean an income of 96.4 per cent (only 3.6 per cent less than if the life had been assumed as 30 years). Doubling the operating expenses ($h = 2$ as compared with $h = 1$) increases the total cost (assuming $n = 25$) from $2.38rC$ to $3.38rC$ or 42 per cent. This table indicates that the operating expenses and rate of return are fully as important from the consumers' viewpoint as the proper selection of the assumed useful life.

TABLE II

Salvage value (j) has been assumed equal to 10 per cent of rate base (C)

| n | $h = 1$ | | | | $h = 2$ | | | | $h = 3$ | | | |
|-----|---------|------|------|------|---------|------|------|------|---------|------|------|------|
| | F | % | % | % | F | % | % | % | F | % | % | % |
| 20 | 2.54 | 100 | | | 3.54 | | | | 4.54 | 100 | | |
| 25 | 2.38 | 93.8 | 100 | | 3.38 | 95.5 | 100 | | 4.38 | 96.5 | 100 | |
| 30 | 2.27 | 89.5 | 95.4 | 100 | 3.27 | 92.5 | 96.7 | 100 | 4.27 | 94 | 97.5 | 100 |
| 35 | 2.20 | 86.7 | 92.5 | 96.9 | 3.20 | 90.5 | 94.6 | 97.9 | 4.20 | 92.5 | 95.8 | 98.4 |
| 40 | 2.15 | 84.8 | 90.4 | 94.8 | 3.15 | 89.0 | 93.2 | 96.4 | 4.15 | 91.4 | 94.5 | 97 |

The relative importance of assumed life and operating expense is shown in Fig. 2. An increase in operating expense from rC to $1.42rC$ (from point a to b) can be offset by increasing the life from 20 to 40 years.

Conclusion.—The amount to provide for functional depreciation is a moot question. Some writers advocate amortization of this kind of depreciation *after* it has occurred. Others contend that at least a portion should be amortized *before* it occurs. To answer the question as to which should and can be used, one must answer the question, "Is the utility a complete monopoly?" That is, can the service being rendered by the utility in question be obtained from some other source? To make the point somewhat clearer, consider two cities supplied with manufactured gas, one by a private company and the other by a municipally owned plant. Then suppose a natural-gas company extends its pipe lines to the immediate vicinity of each city. The first city

would probably demand natural-gas service, especially if it offered material advantages in cost, and would probably also demand that the private utility distribute it and that the manufacturing equipment (production facilities) be withdrawn from the rate base. If the private distributing company refused to do so, the city government could grant the natural-gas company a

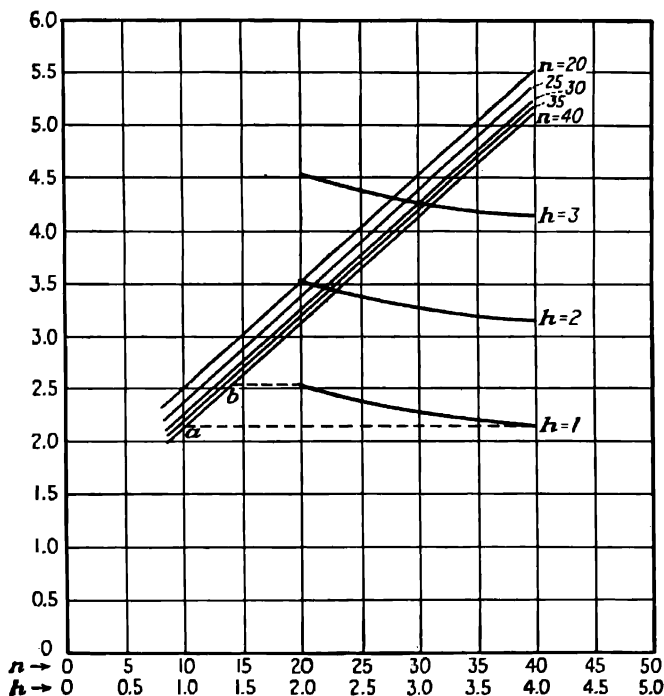


FIG. 2.

franchise to supply gas to its inhabitants, thus forcing the private utility to meet this competition. In the second city, the governing body could do as it pleased. Because of its control over streets, it could refuse permission to the natural-gas company to enter the city and thus save itself the expense of writing off the gas-production equipment. Or, if the citizens demanded natural-gas service, it could amortize the production facilities

after they were discarded, paying for this out of taxes or out of higher rates.

Besides the distinction between absolute and partial monopoly, the question of technological advance and improvement enters the picture. A technological improvement or a new discovery may destroy the value of property to the same extent as a fire, tornado, or flood. Provision must be made for the probability of its occurrence, either by setting aside out of earnings annually a sum deemed to be sufficient, or by allowing a slightly higher rate of return to those who have invested their money in the enterprise. Also, whether the improvements or discoveries are made within the organization or without, that is, whether they are internal or external, has its bearing on the situation. An improvement in method developed by someone outside the utility may force the utility to write off some of its property. If it is made by someone inside the utility, the use of the new process can be deferred or the discarded equipment amortized afterwards out of the savings effected by adopting the new process.

Unless there is an assurance that the owners will be compensated for economic benefits from an improvement caused by internal forces, there will be little or no increase in operating efficiency. Improvement from within results only when the company anticipates greater earning power after the change. For this reason alone if for no other, displaced equipment should be amortized after the new equipment has been installed. The policy of requiring a utility to write off the value of equipment that is still able to function in a fairly efficient manner, as soon as a new piece of equipment is purchased and installed, acts to retard progress. To carry the thought further, the limiting of the return on money invested in an enterprise means little economic improvement while this permissible amount is being earned. The incentive to improve does not occur until the earnings fall below this point, because then the stimulus to bring the earnings back to the maximum amount permitted comes into play and results in action. By permitting functional depreciation to be amortized after its occurrence, a utility would need to provide for physical depreciation only until confronted with a retirement that would have to be amortized out of the savings in operating expenses effected by the new equipment. If the sav-

ings were large, the amortization of the old could be accomplished much sooner. By shortening the period sufficiently, the return could be brought down to what might be considered a fair return. By so doing, all interested parties, those within the organization and those without, would be striving to produce the service at lesser cost, and presumably the customers, owners, and equipment manufacturers would benefit.

During the early days of the electrical industry, when it required 2 to 3 lb of coal to generate 1 kwh, it was possible to develop high-cost hydraulic plants. Today, when much less coal is required, the investment that can be made to pay out in constructing water-power generating plants is not nearly so great as formerly. Therefore, there has been a functional depreciation in water-power plants owing to the improved efficiency of steam plants.

To determine what amounts to allow for this kind of depreciation involves predictions as to what portions of the property are most likely to be in competition with cheaper means of accomplishing what the existing portions are accomplishing. Physical depreciation is a certainty, whereas functional depreciation is problematical; therefore, it appears that funds should be accumulated to take care of physical depreciation and perhaps inadequacy but that all other depreciation of a probable nature should be provided for by the return allowed, unless it is so apparent that this other sort is bound to occur within a reasonable length of time, thus removing it from the realm of extreme improbability, in which case a fund for this should be accumulated. Here again it appears that amortization after functional depreciation occurs would act to improve the situation by removing the element of uncertainty.

The foregoing equations were developed under the assumption that the depreciation reserve was earning interest at the same rate as allowed on the rate base. This situation can exist only in a growing utility. Unless this fund can be used for construction of additional property, the interest earned by such fund will probably be different. It may be invested in government bonds and thus earn a lower rate of interest. But, unless it is returned to the owners, it will earn *some* interest thus barring the straight-line method.

SECTION III

EXPENSES

CHAPTER XII

GENERAL CONSIDERATIONS REGARDING EXPENSES

Consideration of Profits or Net Earnings.—In the operation of any business, there are three general elements to be considered: (1) the gross income, or earnings, (2) the operating expenses, and (3) the net income from the business. The net income is the remainder accruing to the company after paying all legitimate operating expenses out of the gross income. From the net income, the utility must pay the interest on its outstanding obligations and set aside money for such surplus reserves as the company management deems necessary or desirable. The definition of net income is well set forth in the following citations:

“From the rate-making standpoint, the return which a public utility earns is what remains of the gross receipts from the use of the property devoted to the public service after all expenses chargeable against the rate payers have been deducted. This is sometimes called the net earnings. Out of what remains in the net earnings there must be paid interest on debts or bonds; and also interest on floating debts and other liabilities; from what remains in the net earnings dividends are paid on stock or other profits to the shareholders. Sometimes there is remaining a sufficient amount so that a sinking fund may be established or certain parts of the property becoming obsolete or otherwise discarded from that used and useful may be written off the books, or bonds may be retired from such surplus earnings if the dividends are fixed. That is, the profits consist of what is left after all other claims have been satisfied. They form a surplus over and above the expense of operation and production, and constitute that part of the business which goes to those who carry on the business.” *Re Fond du Lac Waterworks*, 5 Wis. R.C.R. 482. “Customers should not be required to pay an amount in excess of a sufficient revenue to meet the company's operating expenses, other proper charges, and a return on the property used and useful in the

public service." *Public Util. Comm. v. Mars Hill E. Co.* (Me. 1936), 11 P.U.R. (N.S.) 40.

The Interstate Commerce Commission has hinted at some possible manipulations in the expense items by which the net earnings may be materially changed. When net earnings are only a small portion of the gross earnings of a company, it is seen that any small changes in either the gross earnings or the operating expenses will make a large percentage change in the net earnings. If the net earnings are 10 per cent of the gross earnings, a change of 10 per cent either in the gross earnings or in the operating expenses will make nearly a 100 per cent change in the net earnings. This phase of the question is discussed in the following citation:

In attempting to draw a conclusion from these net earnings, it must be carefully borne in mind that the amount of the net earnings may be, to a large extent, varied according to the policy of the management in directing expenditures in the bookkeeping adopted. It cannot be assumed because the net earnings shown in one year are somewhat greater or less than those shown in another year, or because the net earnings shown upon one system are greater or less than those upon some other, that this reflects the actual net earning capacity of the two systems generally or for the years indicated. The item, "conducting transportation," cannot be much modified. Whenever a train moves, so much coal must be used and so many be employed at the time of the movement. With maintenance of way and equipment this is not so. A certain amount must be expended to keep the roadbed and other permanent structures and the rolling stock in good condition but a certain other amount, although necessary to keep the property good in the long run, may be laid out sooner or later according to the will of the management. For example, rails may be relaid, but the time of relaying can usually be varied by a considerable period. So, in the removal of a bridge or culvert, there is a leeway of years, usually. A car or an engine may be used after good economy would require its abandonment. The building of a station may be postponed almost indefinitely. From these considerations it results that the management can, without taking from or adding to the items which are actually needed to keep the property good, vary for a particular year or for a series of years, by several hundred dollars per mile, the cost of operation, and thereby the net results. In addition to this, the amount charged to maintenance may be greatly varied by the manner in which the accounts are kept. A new car is purchased in the place of an old one. It is largely more efficient and more expensive. What part of it shall be charged to

permanent improvements and what part to maintenance? So, of the replacement of rails, bridges, culverts, depots, and whatever enters into the construction and equipment of a railroad. Some railroads carefully separate what is properly maintenance from what is strictly an addition; others are liberal in making these distinctions, charging more to maintenance and renewal, and less to betterment, while others charge all improvements against operating expenses. The general tendency in all parts of the country is to charge more to operation than formerly.—Rates from St. Paul to Texas Common Points, 11 I.C.C. 238.

The subject of the proper operating expenses of a municipally owned and operated plant brings up for consideration the item of profit on such operation and certain items that are always present in the operation of privately owned utilities. Some of these items are discussed by the Wisconsin Commission, as follows:

Operating expenses, including depreciation, are always present and must be actually met, no matter by whom the plants are operated. Taxes and interest charges may, in a sense be dispensed with for municipal plants. That is, neither taxes nor interest may be actually assessed against the plants. On the other hand, taxes and interest charges are always present in some form in all industrial activities. Waterworks represent property that is of value and in which money has been invested. They constitute part of the capital of the city. If such items as fixed charges are not considered by municipal plants in fixing rates for private consumers, it would seem that these consumers would be favored as against the taxpayers. There does not on the whole appear to be any equitable ground upon which such charges can be entirely eliminated in any industry or in connection with the services of any public utility.—*Re Madison City Waterworks*, 3 Wis. R.C.R. 299.

Consideration of Expenses.—The books of a company ordinarily are relied upon for information concerning the operating expenses. With some criticisms as to general accounting methods and certain allowances, the regulatory bodies take these statements as they appear. However, in some cases, these accounts are found to be so poorly kept that the commission's accountants and engineers have to devise an entire new set of accounts for the company based upon estimates and upon comparisons with similar companies. These cases usually arise from the inability of the management of the company to make the proper allocations of vouchers to the proper accounts and to separate such items as labor and materials for operation and maintenance from those of replacement and extensions. Some

bills for materials and labor need to be allocated to at least three different classes. A new pipe laid in place of an old one may be larger and of more durable material. This change may be classed as a repair of the old installation, made necessary by poor condition of the original installation, and also as an extension of the old installation to care for growth of business in this district. This work must then be allocated properly to the items of maintenance, depreciation reserve, and new capital. Other items of expense to be considered later may have been charged contrary to good operating practice or contrary to that permitted by the commission for similar enterprises.

Certain items of expense come under the careful scrutiny of the commission, such as vouchers for expenses in connection with lobbying before legislative bodies¹ and holding-company allocations to expenses.² These items will be discussed more in detail in other sections. Mistakes of management in making investments in property that later operation proves to be unnecessary^{3,4} are carefully considered. Unless there is proof that these expenses are clearly not necessary, they are allowed by regulatory bodies and by the courts, since the commission or the court cannot put itself in the place of the management,⁵ unless gross mismanagement is shown. Unless proved to be contrary to law or good business practice, they are usually allowed as shown on the books of the company.

Comparison of Expenses.—Ordinarily, comparison of expenses of one utility with those of another of approximately the same size or comparison of unit expenses is of little value, since the conditions surrounding the two enterprises usually are so different that these comparisons throw little light on the question.^{6,7}

¹ *Re Wisconsin Tel. Co. (Wis.)*, P.U.R. 1933C, 282.

² *Public Util. Comm. v. Oquossoc L. & P. Co. (Me. 1936)*, 11 P.U.R. (n.s.) 25.

³ *Oklahoma Natural Gas Co. v. Oklahoma Corp. Comm.*, 90 Okla. 84, 216 Pac. 917, P.U.R. 1924A, 133.

⁴ *Pennsylvania P. & L. Co. v. Public Service Comm.*, 128 Pa. Super. 195, 193 Atl. 427 (1937), 19 P.U.R. (n.s.) 433.

⁵ *Wichita Gas Co. v. Public Service Comm. (Kan.)*, P.U.R. 1928D, 124; *Plymouth E. L. Co. v. State*, 81 N.H. 1, 120 Atl. 689.

⁶ *Springfield v. Springfield Gas & E. Co.*, 291 Ill. 209, 125 N.E. 891, P.U.R. 1920C, 640.

⁷ *Rhode Island Pub. Service Comm. v. New England T. & T. Co. (R.I.)*, P.U.R. 1926C, 208.

However, from the average costs of certain items of the expense accounts, it can be seen whether or not these items are out of line with similar ones of like utilities in the same state or district. For instance, salaries of officers and other so-called general expenses may differ so greatly per unit of output or per customer as to require a careful scrutiny to ascertain the reason for this difference. In some cases, the item is found to be too low because the manager, who at the same time is the owner, may not have withdrawn his salary as such from the business; in other cases, too much may have been charged to management and too little to other operating expenses. Also, payments to holding companies for management may have been large, thus making the total expense excessive. In these cases, recourse is had to comparisons with other utilities of the same class. Other items may also be out of line, such as the amount for fuel or labor per unit of output owing to inefficient operation of older types of equipment or of equipment not kept in condition by proper maintenance.^{1,2}

Without an intimate knowledge of the two utilities the expense items of which are being compared, wrong conclusions are almost inevitable. One railroad system may be located in a densely populated area, whereas another with practically the same track mileage may be in a sparsely settled region, and the kind and amount of freight carried may be decidedly different. One electric utility may be located in a city where there are a comparatively few large industries, each purchasing a great amount of electrical energy, and a second may be located in another city of about the same population but which has many small industries each using only a small amount of power. Ordinary reasoning leads one to conclude that the costs of operating the second will be greater than the first unless there are offsetting lesser expenses, such as lower cost of fuel. Then, too, one utility may be located in a community where cheap natural gas prevents the development of an electrical load, whereas in the other city no natural gas may be available. Also, in one city the characteristics of the load served may permit a much greater average load throughout the 24 hours of the day, and in the second the load may be as great but of much shorter duration. Comparison of

¹ Philadelphia Rapid Transit Co. (Pa.), P.U.R. 1926B, 385.

² Re Nekoosa Edwards L. & P. Co. (Wis. 1936), 11 P.U.R. (N.S.) 50.

one expense item without at the same time comparing all the items may result in great injustice. However, if there are such extra costs, which are unexplainable and which cannot be justified, it is doubtful whether a commission will allow them to be passed on to the consumers by charging higher rates than otherwise would be necessary.

Discretion of Management as to Operating Expenses.—Except for certain items and under very unusual circumstances, commissions do not undertake to put themselves in the place of the management of the utility. "In the absence of evidence to the effect that the utility was operated in an uneconomical manner, it must be assumed that the management conducted the affairs discreetly and with the sound business judgment that an ordinary prudent business man would exercise in the conduct of his own affairs." In like manner, the "hypothetical judgment of an accountant as to what the operating expenses of a public utility should be should not be substituted for the actual operating experience of the utility." However, the commission may scrutinize the accounts of the utility to see that no extravagant expenditures have been incurred and charged to the operating expenses. When no abuse of discretion is shown, the accounts are usually allowed as they appear on the books. This situation is covered by the decision of the United States Supreme Court, in the *West Ohio Gas Case*, as follows:

A reduction by a state Commission, of a gas utility's operating expense claim for lost gas as a result of leakage without evidence of negligence or waste by the company, was held to be arbitrary. Although an estimation by a Commission of distribution costs and commercial expenses of a gas utility, on the basis of total area (11 communities) served by the utility may not have been necessarily erroneous, the adoption of such method by the Commission without notice to the utility was held to be an exercise of arbitrary power in violation of the due process clause of the Constitution. A state Commission's action in reducing an allowance claimed by a gas utility for new business expense, without evidence of inefficiency or improvidence in making such expenditures for such purpose, was held to be arbitrary.—*West Ohio Gas Co. v. Public Service Comm.*, 294 U.S. 63, 79 L. ed. 761, 55 Sup. Ct. 316 (1935), 6 P.U.R. (N.S.) 449; 294 U.S. 79, 79 L. ed. 773, 55 Sup. Ct. 324 (1935), 6 P.U.R. (N.S.) 459.

CHAPTER XIII

GENERAL EXPENSES

Salaries of Officers.—Officers' salaries are a proper charge to operating expenses, and in accounting they are usually classed under general expenses. However, for an officer's salary to be applicable under this classification, he must have rendered some service in the operation of the company.¹ It is common to make allowance for the amount of the operating expenses chargeable to this classification and to permit the utility to use its judgment in the apportionment of the amount to the different officers.² In a company in which certain of the general officers have charge of several combined branches of the utility, the salaries of such officers must be allocated among the different divisions according to some proper apportioning scheme. The salaries of the sub-officers, each of whom has charge of some division of the general utility, are allocated to that particular division over which he has charge. The salary account should be divided among different divisions of a combined utility and among operating expenses, depreciation reserve, and new capital as carefully as are items of materials and labor.

Gratuitous service given to a utility by its officers who are also owners of the utility, and who also receive profit from its operation, should be treated as if actually paid by the utility, for, in the absence of these officers who are devoting their time to the operation, it is assumed that the utility would have to employ other skilled officers at the same salary. In other words, the salary paid to a real executive owner is not to be considered as

¹ Consolidated Tel. Co. v. Georgia Public Service Comm. (1934), 2 P.U.R. (n.s.) 454; Brooklyn Borough Gas Co. v. Prendergast (N.Y.), P.U.R. 1927A, 200; Re Cayuga Omnibus Corp. (N.Y.), P.U.R. 1931C, 238; Re Western Ohio Pub. Service Co. (Ohio), P.U.R. 1931D, 1.

² Re Detroit Edison Co. (Mich. 1937), 16 P.U.R. (n.s.) 9; Re Southern Bell Tel. Co. (S.C.), P.U.R. 1933B, 182; Pacific T. & T. Co. v. Thomas (Ore. Cir. Ct. 1936), 13 P.U.R. (n.s.) 337.

profit from operation.¹ However, a salary paid to an owner who does not render any services in operation should be excluded. Where the total amount paid by the utility for salaries is found to be excessive in comparison with similar utilities of the same class, commissions sometimes reduce the total salary allowance to what is considered to be a fair amount.² In using this discretion, the commission must be careful not to put itself in the place of the management of the company without sufficient evidence of poor judgment on the part of the company. In this connection, failure to reduce salaries during the late economic depression was severely criticized by some commissions.³ The amount of salary allowed the officers depends upon the income of the utility, or, rather, the amount of business the utility handles, so that the salary budget may be commensurate with the other operating expenses and the income. In some decisions, it has been held that amounts paid for salaries and other general expenses in excess of a fair amount should not be charged to operating expenses, but, if the utility cares to pay such expenses, that the excess should be paid out of net return. Salaries paid to officers of holding companies who are not resident have been criticized by some commissions.⁴ This subject will be treated more fully under Payments to Holding Companies, to be considered later.

Wages.—The commissions hold that current wages paid for similar labor in the same region should hold for the utility. Where union labor is used, union wages, fixed for the different classes of service, must hold from year to year. However, a utility should not pay excessive wages to an unusual number of employees merely because these payments may be charged to the operating expenses, which are in the last analysis met from the rates.⁵ In one case it was ruled that payment of part of the

¹ *Re Mountain City Water Co. (Pa.)*, P.U.R. 1922D, 762; *Customers of Electricity v. Boonville (N.Y. 1934)*, 5 P.U.R. (n.s.) 298.

² *Re Poughkeepsie & W. Falls E. Co. (N.Y. 2d Div.)*, P.U.R. 1920C, 995; *Re Madison R. Co. (Wis.)*, P.U.R. 1928C, 842; *Department Public Works v. Pacific County Bridge Co. (Wash.)*, P.U.R. 1928D, 280.

³ *Sharp v. Newville Water Co. (Pa.)*, P.U.R. 1929B, 320; *Re Southern Bell Tel. Co. (S.C.)*, P.U.R. 1933B, 182.

⁴ *Re Broad River P. Co. (N.C.)*, P.U.R. 1933C, 351; *Re Freeport Gas Co. (Ill.)*, P.U.R. 1920B, 726.

⁵ *Re Western New York & Pennsylvania Tel. Co. (N.Y. 2d Dist.)*, P.U.R. 1920A, 951.

wages to a trust fund from which stock was purchased for the employees should be allowed in full as part of the wages.¹ Increases in wages due to general wage increases and increases on account of the need for complying with the National Industrial Recovery Act were allowed.² Reduction of prevailing wages during an economic depression should be met with similar reductions by the utility,³ and, likewise, the increase caused by increasing costs after a depression should be allowed to the utility.⁴

Pensions.—Many utilities have provided a pension system for the older employees and have applied this to the newer ones as an incentive for them to remain with the company. The early provisions were made by deducting a certain amount each month from the pay of each employee insured, applying this either to a pension fund under the management of the company or to the purchase of an insurance policy payable to the employee at his retirement. Later, these amounts were provided by the company and were considered as an increase in the pay of each faithful employee. The question arose in many cases whether amounts applied in this manner should be charged to operating expenses or whether they should be deducted from or charged to the net return. Almost universally it has been held by commissions and courts that sickness and pension provisions are a proper charge against the operating expenses of a public utility and that the method to be adopted in making such provisions is fairly open to the discretion of the officers of the company.⁵ In a few cases they were disallowed, because the fund was not set up on the proper basis for protection of the employees.⁶ In one case the present method of making the allowance was approved, but

¹ *Re Philadelphia Rapid Transit Co. (Pa.)*, P.U.R. 1926B, 385.

² *Re Rates and Rate Structures (N.Y. 1934)*, 1 P.U.R. (n.s.) 113; *Re Public Service Co. of Northern Illinois (Ill. 1934)*, 4 P.U.R. (n.s.) 1; *Re Lincoln T. & T. Co. (Neb.)*, P.U.R. 1929E, 33; *Oregon-Washington Water Supply Co. v. Department Public Works*, 184 Wash. 451, 51 P. (2d) 610 (1936), 11 P.U.R. (n.s.) 478.

³ *Re Southern Bell Tel. Co. (S.C.)*, P.U.R. 1933B, 181.

⁴ *Department Public Works v. Pacific P. & L. Co. (Wash. 1936)*, 13 P.U.R. (n.s.) 187.

⁵ *Consolidated Gas Co. v. Newton*, 267 Fed. 231, P.U.R. 1920F, 483; *Re Public Service Co. (Ill. 1934)*, 4 P.U.R. (n.s.) 1.

⁶ *Re Wisconsin Tel. Co. (Wis.)*, P.U.R. 1932D, 173; *id. (Wis. 1936)*, 13 P.U.R. (n.s.) 224.

provision for the fund was started late, and it was ruled that the deficit in the fund on this account should be made up from the net return of the company.¹ Where the method of setting up the fund was not sound, the allowances to operating expenses were disapproved.² In other cases it was held that allocation must be made for the allowance between operating expenses and construction costs in proportion to the pay roll for the two purposes.

The plan of the New York Telephone Company, a subsidiary of the American Telephone and Telegraph Company, is cited in the following:

The subject of the benefit plan of the telephone company is wholly commendable; the operation of the plan by inspiring loyalty and more individual efforts should return more material benefits to the company and as a business policy a corporation could ill afford to neglect the care and upkeep so essential to the maintenance of its mechanical plant unit, and by the same reasoning an equal amount of consideration must be given to the human element of its organization if a maximum standard of efficiency is to be maintained. It was concluded that, in general, the employees' benefit plan seemed well advised and comprehensive, the benefits fairly considered and provided, and the administration of the plan economically handled as would be consistent with its intent and purpose.—*Re New York Tel. Co. (N.Y.)*, P.U.R. 1923B, 545.

Bonuses and Profit Sharing.—In some utilities employees and officers of the company are provided with bonuses, free service, and profit-sharing allowances. In other utilities stockholders are given free service and other privileges not given to customers who are not stockholders. The propriety of free service of any kind will be discussed later under service. Where these expenses involve charges to operating expenses, they are usually disapproved by the commission. They may be charged to net return, if so desired by the utility.³

Maintenance, Replacements, and Betterments.—Proper maintenance costs are legitimate operating expenses of any utility. These expenses should be nearly uniform in amount from year to

¹ *Erie v. Mutual Tel. Co. (Pa.)*, P.U.R. 1931A, 169.

² *Re Chesapeake & Potomac Tel. Co. (D.C. 1934)*, 4 P.U.R. (n.s.) 346; *Re New York Tel. Co. (N.Y.)*, P.U.R. 1932D, 20.

³ *Moritz v. Edison E. L. Co. (N.Y. 1st Dist.)*, P.U.R. 1917A, 364; *Kings County L. Co. v. Lewis*, 110 Misc. 204, 180 N.Y. Supp. 570, P.U.R. 1920D, 145; *Public Service Comm. v. St. Joseph R.L.H. & P. Co. (Mo. 1936)*, 14 P.U.R. (n.s.) 113.

year, increasing gradually with the growth of the business.¹ Theoretically, these expenses should be less on new property or on a new unit of the property than they are toward the end of the life of the unit. However, in a property that has gone through several cycles of replacements for most of the parts, these costs will become uniform, for there are new parts as well as older units in service at any particular time. A utility that is well maintained will have a longer life of its parts and will have a lower depreciation requirement for replacements and renewals.² To defer the maintenance from year to year, in order to be able to pay a better dividend in any year, is a poor policy and sooner or later leads the company into difficulties. In some cases, these deferred maintenance costs have been passed along to the depreciation reserve account instead of appearing in the operating expense account as they occurred. In such cases the court or commission may require the company to restore this amount to the depreciation reserve from any surplus account or else to amortize the reserve from the net return of future years. Deferred maintenance simply passes along the costs of one period to the customers of a later period. On the basis of requiring rates to be established on the cost of service, such a method of accounting defeats the purpose of uniformity in rate regulation.³ Maintenance of services and lines that were paid for by customers should be allowed, for it is a part of the operating cost, although the value of such property is not allowed in the rate base.⁴

Renewals and replacements are to be provided for out of the rates earned by the utility. They are a part of the cost of the

¹ *Galveston v. Galveston E. Co.*, 258 U.S. 388, P.U.R. 1922D, 159; *Re New England T. & T. Co. (R.I.)*, P.U.R. 1926C, 208; *Herr v. Lancaster Suburban Water Co. (Pa. 1936)*, 14 P.U.R. (N.S.) 369; *Pacific T. & T. Co. v. Thomas (Ore.C.C. 1936)*, 13 P.U.R. (N.S.) 337.

² *Re Home Tel. Co. (Ind.)*, P.U.R. 1918A, 27; *Peck v. Indianapolis L. & H. Co. (Ind.)*, P.U.R. 1916B, 445; *Board R. Comm'rs (N.D.)*, P.U.R. 1925A, 19.

³ *Re Northern Indiana Gas Co. (Ind.)*, P.U.R. 1920D, 470; *Re Boise S. R. Co. (Idaho)*, P.U.R. 1922B, 796; *Re Second Avenue R. Co. (N.Y. Transit)*, P.U.R. 1928B, 820; *Public Service Comm. v. St. Joseph R.L.H. & P. Co. (Mo. 1936)*, 14 P.U.R. (N.S.) 113; *Re Estelline T. & T. Co. (S.D.)*, P.U.R. 1917E, 151.

⁴ *Department Pub. Works v. Grays Harbor R. & L. Co. (Wash. 1934)*, 12 P.U.R. (N.S.) 178; *Department Pub. Works v. Seattle Gas Co. (Wash. 1934)*, 3 P.U.R. (N.S.) 433.

service and do not represent the addition of new capital but are a maintenance of the integrity of the investment. They must be paid for out of the depreciation reserve set up for that purpose. In any construction involving replacement, care must be exercised to allocate the costs to the proper divisions, maintenance going directly to the operating expense account, renewals and replacements going to the depreciation reserve, and betterments going to new capital. In this manner, a proper accounting can be made of the operations of the utility, and these costs can be reflected in their proper places in the rates.¹

In the case of betterments, it is clear that such new extensions of the property must be offset by an increase in the rate base. For this reason, all items of this character must be paid for out of the new capital. Even though this sum may be borrowed from the reserve for depreciation, it is nevertheless a charge to capital, and the company has a right to earn a fair return on this amount, but it must pay interest to the depreciation reserve just the same as it would to bankers or security holders. Whether or not this is offset by a deduction for accrued depreciation and money is taken from the reserve for this purpose does not alter the status of the charge.²

Printing and Advertising.—Reasonable institutional advertising and expenditures for the expansion of business of a going utility are unquestionably a proper charge to operation.³ To what extent a company engaged in private business shall advertise is a question of managerial policy, and the decision of the management is controlled by the consideration of the probable

¹ *City of Blytheville v. Blytheville Water Co.* (Ark. 1936), 15 P.U.R. (n.s.) 177; *Re Philadelphia Rapid Transit Co.* (Pa.), P.U.R. 1926B, 385; *Plymouth E. L. Co.*, 81 N.H. 1, 120 Atl. 689, P.U.R. 1923E, 84; *Re Northwestern Pacific R. Co.* (Cal. 1936), 9 P.U.R. (n.s.) 471.

² *Re Kenosha* (Wis.), P.U.R. 1918D, 751; *Re Hooper Tel. Co.* (Neb.), P.U.R. 1920B, 225; *Re Elko County T. & T. Co.* (Nev.), P.U.R. 1920F, 368; *Cavanaugh v. Whitefish Municipal Water Util.* (Mont.), P.U.R. 1922E, 198; *Reno P. L. & Water Co. v. Public Service Comm.*, 200 Fed. 645, P.U.R. 1923E, 485; *Re Pacific Gas & E. Co.* 1 Cal. R.C.R. 547; *Re San Fernando T. & T. Co.* (Cal.), P.U.R. 1920B, 807; *Re Long Island R. Co.* (N.Y. Transit), P.U.R. 1928C, 748; *Re New Hampshire Gas & E. Co.* (N.H.), P.U.R. 1931D, 225.

³ *Re New York Tel. Co.* (N.Y.), P.U.R. 1923B, 545; *Stamford v. Stamford Gas & E. Co.* (Conn.), P.U.R. 1924E, 609; *Wichita Gas Co. v. Public Service Comm.* (Kan.), P.U.R. 1928D, 125.

outcome, *i.e.*, whether it will be profitable. There are several forms of advertising used by privately owned utilities, all of which are for the purpose of increasing either directly or indirectly the income of the company. One type of advertising takes the form of explaining the policies of the company and the method of determination of the rates. This is intended to place before the patrons the whole problem of the costs of operation and distribution of the commodity to each different class of consumer. Another form of advertising is for the purpose of promoting a wider use of service such as better illumination and the use of various household appliances. Advertising cooking and heating devices by means of displays in the daily papers and by pamphlets included with the monthly statements may be charged to operation or to merchandise activities, the distinction being whether the advertisement covers appliances generally or only those being sold by the utility. These campaigns are for the purpose of building up the output of the utility, the load which will serve to lower the unit cost of operation to all, later to be reflected in lower rates generally. Street railways have built up their business in the past by means of amusement parks and other similar attractions at the ends of otherwise unprofitable lines. However, the cost of publishing articles arguing against public ownership was not approved when charged to operating expense.¹

Cost of Financing.—The cost of financing as an operating expense covers bond discount and interest on bonds. When bonds are issued at less than par in order to make them more attractive to investors, the amount of money actually derived from their sale is less than the par value of the bonds. The face value of the bonds must be paid to the owners at the time of maturity, and interest must be paid on the par value for the entire life of the bond. The company must, therefore, set aside a fund to amortize the amount of the bond discount. This money must come from the earnings of the property during the life of the bonds rather than from new capital and is equivalent to an increase in the interest rate. Under Valuation, it has been found that the cost of financing cannot be capitalized and included in the rate base of the utility, for the property is of no greater value with a bonded debt than when it is financed entirely

¹ Re Union E. L. & P. Co. (Mo. 1937), 17 P.U.R. (N.S.) 341.

by the sale of stock. Bond discount and bond interest (other than rate of amortization) are not proper items to be included in operating expenses of the company. The interest on the bonds must be paid out of net return, and the reserve to retire the bonds at their maturity must come from the same source. The rate of return should be made large enough to permit this to be done.¹

All payments of interest on bonded indebtedness of the company should be charged to capital interest account, and not to current expenditures. Though payable out of earnings before any dividend can be made to stockholders, they cannot be deducted for the purpose of determining the "net earnings" of the road. The bonded debt incurred for the purpose of the construction and equipment is but another form of capital, analogous to preferred stock; and the interest accruing thereon is in the nature of a dividend on such capital. It has nothing to do with, and cannot affect, the amount of the net earnings of the road.—*Union Pacific R. Co. v. United States*, 99 U.S. 402, 25 L. ed. 274.

Taxes.—The tax burden placed on all property and all forms of business has increased greatly during the past few years. That paid by some public utilities has increased even faster than that on most other property. At the present time, the electrical utilities pay out, in one form or another, over 15 per cent of their gross earnings as taxes. These include property taxes, franchise and gross earnings taxes, Federal and state income taxes, excess profits taxes, and many other miscellaneous taxes. These may nearly all be included in the operating expenses of the utility, and they must be paid before any dividends are paid to the stockholders. Taxes will be discussed under several different heads or classes.

Property Taxes.—Since a public utility must make reports on the value of its property for use as a rate base as well as for taxation purposes and since the income of the property is to be found in reports to the commissions, it is easier for an assessor to determine the value of such property than that of similar

¹ Re Southern Counties Gas Co. (Cal.), P.U.R. 1915E, 197; Re Atlantic City Sewerage Co. (N.J.), P.U.R. 1923A, 734; Re Buskhannon L. & Water Co. (W. Va.), P.U.R. 1920E, 848; *Oklahoma Natural Gas Co. v. Oklahoma Corp. Comm.*, 90 Okla. 84, 216 Pac. 917, P.U.R. 1924A, 134; *Citizens of Bryson City v. Smoky Mountain P. Co.* (N.C. 1937), 18 P.U.R. (n.s.) 344.

property used in any other form of business. As a consequence, not only is the rate of taxation but also the basis or assessed value easily determined. In lieu of a property tax, some states levy taxes on gross income. That a utility should pay a property tax (or its equivalent) is only just and right, as all property should bear its portion of the tax burden of supporting the government. However, the assessed valuation of the property for taxation and the rate of the tax should be equitable as compared with property owned by individuals and industrial companies.¹ The tax on the value of municipally owned plants is one that is seldom paid into the city, county, or state treasuries, even though the value of the plant constitutes just as much a part of the property value of the city and state as does that of privately owned plants. If this property pays no tax, then other property must pay a greater tax and the persons who purchase the service from such a plant do not pay their fair proportion of the taxes of the community.² Taxes on a municipal plant are sometimes considered as an offset to free service received by the city from the plant. As a general rule, this free service represents much less value than the real loss of tax income, and the tax burden is shifted in an inequitable manner. A study of value of free services rendered and of contributions made by municipally owned plants in Minnesota, made by Prof. A. M. Borak, showed that over a period of years these contributions and free services were less than taxes paid by private utilities. When taxes become an operating expense of any utility, it means that these taxes are not paid by the utility owners from net income but are really paid by those who use the service, *i.e.*, the tax burden is shifted by the utility to the customers. The utility really becomes a tax collector to this extent, and the city is enabled to lower the tax rate on other property.

Franchise Tax.—In some cities utilities are assessed a franchise tax. This tax is usually provided for in the original franchise and

¹ Re Kenosha (Wis.), P.U.R. 1918D, 751; Re Munkwango (Wis.), P.U.R. 1922B, 109; Philadelphia v. Philadelphia Rapid Transit Co. (Pa.), P.U.R. 1923E, 190; Re Middlesex Water Co. (N.J.), P.U.R. 1927B, 385.

² Customers of Electricity v. Boonville (N.Y. 1934), 5 P.U.R. (N.S.) 298; Logansport v. Indiana Pub. Service Comm., 202 Ind. 523, 177 N.E. 249, P.U.R. 1931E, 179; Re Milwaukee (Wis. 1926), P.U.R. 1927B, 299.

is an agreement between the municipality and the utility. Gross income taxes paid by utilities to municipalities and to the states are similar in nature to a franchise tax. In other cases a tax is based on a specified amount per mile of line, pipe, or conduit over or under the streets and alleys of a city or per mile of railway track on the city streets. In each case these taxes are allowed as proper items in the operating expenses of the utility and are ultimately paid by the user of the service, on the assumption that adequate rates to accomplish this can be charged.¹

Federal Income Tax.—One of the newer forms of taxation on public utilities as well as other business enterprises is the Federal income tax. In the law passed by Congress, creating this tax, it was provided that the tax on the income of the corporation, after deducting the expenses and other specified items, should be paid by these corporations in proportion to their income on a sliding scale of rates. It was also provided that, since the income that was paid to the owners of the stocks and bonds in the form of dividends and interest is taxed and paid by the utility, those owning these securities should be entitled to deduct this amount of income before calculating their own income tax. In other words, the income received from public-utility securities as well as that from tax-free bonds is net income to the owners of these securities. When these taxes came up for consideration, most of the commissions ruled that the Federal income tax was not a proper item of operating expense. The Interstate Commerce Commission and the Federal courts held that the tax was like any other and should be classed as an operating expense. This confusion existed until the Supreme Court decided, in the Galveston Electric Case, that the Federal income tax was like any other tax, being a part of the operating expense of the utility, but that the payment of this expense by the utility instead of by the holders of the securities should be considered in the allowance for the return that the utility is permitted to earn. All decisions of the Supreme Court since the Galveston Case have concurred in this opinion; those of the commissions and lower courts have merely

¹ Re Home Gas & E. Co. (Colo.), P.U.R. 1930A, 56; Re Nashville R. & L. Co. (Tenn.), P.U.R. 1920C, 1; Consolidated Gas Co. v. Newton, 267 Fed. 231, P.U.R. 1920F, 483; Elmhurst v. Western United Gas & E. Co., 263 Ill. 144, 1 N.E. (2d) 489 (1936), 13 P.U.R. (n.s.) 441; Department Public Works v. Pacific P. & L. Co. (Wash. 1936), 13 P.U.R. (n.s.) 187.

tried to explain and verify these decisions. The decision of the Supreme Court follows:

There is no difference in this respect between state and Federal taxes, or between income taxes and others. But the fact is that the Federal corporate income tax for which deduction is made must be taken into consideration in determining what rate of return shall be deemed fair. For, under Art. 216, the stockholders do not include in the income on which the normal Federal tax is payable dividends received from the corporation. This tax exemption is therefore, in effect, part of the return on the investment.—*Galveston E. Co. v. Galveston*, 258 U.S. 388, 66 L. ed. 678, 42 Sup. Ct. 351, P.U.R. 1922D, 159. For a similar decision see also, *Georgia R. & P. Co. v. Georgia R. Comm.*, 262 U.S. 625, 67 L. ed. 1144, 43 Sup. Ct. 680, P.U.R. 1923D, 1.

Federal income tax like all other classes of tax is a deduction from operating revenue rather than an operating expense as defined under the Uniform Classification of Accounts for Electric Utilities prescribed by the Federal Power Commission.¹

Other Special Taxes.—There are many other special taxes, Federal, state, and local, which must be paid by each utility. Among those allowed as proper operating expenses by state commissions and courts are the following: tax on bondholders return,² Federal and state capital stock taxes,³ corporation tax,⁴ gasoline tax for motor vehicle operation,⁵ Federal tax on

¹ *Oklahoma Natural Gas Co. v. Oklahoma Corp. Comm.*, 90 Okla. 84, 216 Pac. 917, P.U.R. 1924A, 134; *Re San Antonio Pub. Service Co. (Tex.)*, P.U.R. 1924A, 259; *Charleston v. Public Service Comm.*, 95 W. Va. 91, 120 S.E. 398, P.U.R. 1924B, 601; reversing (*W. Va.*), P.U.R. 1924A, 357; *Re Public Service Co. of Northern Ill. (Ill. 1934)*, 4 P.U.R. (n.s.) 1; *Re Chambersburg Gas Co.*, 116 Pa. Super. 196, 176 Atl. 794 (1935), 7 P.U.R. (n.s.) 359; *Municipal Gas Co. v. Wichita Falls (Tex.)*, P.U.R. 1925B, 410; *Hopkins v. Southwestern Bell Tel. Co. (Kan.)*, P.U.R. 1923A, 321; reversed 115 Kan. 236, 223 Pac. 771, P.U.R. 1924D, 388; *Re City of Milwaukee (Wis.)*, P.U.R. 1927B, 230; *Re Great Falls Gas Co. (Mont.)*, P.U.R. 1928E, 805; *Re Barron County Tel. Co. (Wis.)*, P.U.R. 1933E, 403; *Re Home Gas & E. Co. (Colo. 1934)*, 5 P.U.R. (n.s.) 107.

² *Northern Indiana Gas & E. Co. (Ind.)*, P.U.R. 1920D, 470.

³ *Hering v. Clark's Ferry Bridge Co. (Pa.)*, P.U.R. 1926D, 516; *Nace v. McConnellsburg Water Co. (Pa.)*, P.U.R. 1926E, 249; *Virginia R. & P. Co. v. Portsmouth (Va.)*, P.U.R. 1924B, 130; *Re Great Falls Gas Co. (Mont.)*, P.U.R. 1928E, 903.

⁴ *Re Southern California Tel. Co. (Cal.)*, P.U.R. 1925C, 627.

⁵ *Re Wisconsin P. & L. Co. (Wis.)*, P.U.R. 1932B, 351.

power sales,¹ tax on license for operation and paving,² dividend taxes,² park maintenance tax,³ employees tax under the Federal Social Security Act,⁴ and fire-protection tax.⁴ Taxes that have been disapproved as items in the operating-expense statement are as follows: tax on mortgages,⁵ Federal excess profits tax,⁶ state loan tax,^{7,2} emergency profit tax,⁷ state bond tax,^{7,8} corporate loan tax,⁷ and the corporate surplus, or Federal undistributed profits, tax.⁹

¹ Re Washington Water P. Co. (Wash. 1934), 3 P.U.R. (N.S.) 16; Re Rates and Rate Structures (N.Y. 1934), 1 P.U.R. (N.S.) 113; reversed in *New York Edison Co. v. Maltbie*, 150 Misc. 200, 270 N.Y. Supp. 409 (1934), 1 P.U.R. (N.S.) 481; lower courts sustained in 244 App. Div. 436, 279 N.Y. Supp. 949 (1935), 8 P.U.R. (N.S.) 337; Re Home Gas & E. Co. (Colo. 1934), 5 P.U.R. (N.S.) 107; Re Wrightsville (Pa.), P.U.R. 1925C, 705.

² Re Philadelphia Rapid Transit Co. (Pa.), P.U.R. 1926B, 385.

³ Re United R. & E. Co. (Md.), P.U.R. 1928C, 605; Re Phoenix S. R. Co. (Ariz.), P.U.R. 1926A, 671.

⁴ Re West Virginia Water Supply Co. (W. Va. 1937), 17 P.U.R. (N.S.) 40.

⁵ *Kings County L. Co. v. Lewis*, 110 Misc. 204, 180 N.Y. Supp. 570, P.U.R. 1920D, 145.

⁶ *Charleston v. Public Service Comm.* (W. Va.), P.U.R. 1924B, 601.

⁷ *Hering v. Clark's Ferry Bridge Co.* (Pa.), P.U.R. 1926D, 516; *Nace v. McConnellsburg Water Co.* (Pa.), P.U.R. 1926E, 249; *Virginia R. & P. Co. v. Portsmouth* (Va.), P.U.R. 1924B, 130; Re *Great Falls Gas Co.* (Mont.), P.U.R. 1928E, 903.

⁸ Re Wrightsville, *supra*.

⁹ *Edison L. & P. Co. v. Driscoll* (Pa. 1937), 20 P.U.R. (N.S.) 353.

CHAPTER XIV

OPERATING EXPENSES

Rent.—Where property not owned by a utility is leased from some disinterested party in an arm's-length agreement, the amount paid for rent is a proper charge to operation,¹ provided that the value of this leased property is not included in the rate base, in which case the rental paid should not be included in operating expenses but should offset the earnings on the value allowed for the property.² Where the property is owned jointly by several divisions of the same utility or by a holding company and the particular utility leases a part of this property for its own use, the rent paid for the use of the property is a proper operating expense. However, in this latter case, there can be no arm's-length agreement, and it becomes necessary to make a determination of the proper rental. This is done either by allocation of the expenses of operation of this property among the different divisions in some fair method or else by comparing rents paid for similar property in the same locality. These rents are then a proper charge to operation. Space used by a municipal plant in the buildings owned by the city should receive a rental charge on the books of the utility, whether or not the utility actually pays this amount.³

Commodity Costs.—No Intercompany Relations.—Many utilities purchase their electricity from transmission systems or their natural gas from pipe-line companies and simply distribute this service to their customers. When there are no intercompany relations between the two companies, an arm's-length contract may be entered into for the commodity purchased, and an agreed gate rate is established by this means. Such contracts are recognized as binding by regulatory bodies if the rates charged

¹ Philadelphia Rapid Transit Co. (Pa.), P.U.R. 1926B, 385.

² Re Gary R. Co. (Ind.), P.U.R. 1931D, 455; Re Kentucky-Tennessee L. & P. Co. (Tenn.), P.U.R. 1932E, 386.

³ Re Village of Boonville (N.Y. 1934), 5 P.U.R. (N.S.) 298.

are reasonable. The case of contracts for a similar service from intercorporate related companies will be considered in the next chapter.¹ A case before the Montana Commission is cited:

As we conceive the duties of a public utility, it is incumbent upon it to produce its service as economically as practicable and that it is not free to adopt a less economical method of producing its service and charge to its patrons on the basis of such excessive cost. And, having entered into a contract which reduces the cost of obtaining its product below the cost of producing it with a plant constructed by itself, it has not the right to capitalize the difference or any part of it. If it should be made to appear that by reason of its advantageous contract, a portion of the utility's property devoted theretofore to the public service, is rendered obsolete or unnecessary, equity requires that it be permitted to amortize the value of such superseded property, less salvage, over a term of years out of earnings.—*Public Service Comm. v. Great Northern Util. Co. (Mont.)*, P.U.R. 1929B, 176.

Payments to Holding Companies.—In the case of intercorporate relations between an operating company and a holding company, the regulatory bodies take the attitude that there can be no arm's-length contract. For this reason they scrutinize payments of all kinds made by the operating companies to these holding companies. These payments take the form in some cases of a percentage of the gross receipts of the operating company, for which payments the operating company receives certain help in the form of engineering, accounting, financing, and managerial advice and assistance. In other cases charges are made for managerial assistance both in the construction and in the operation of the company. One of the oldest of these contracts is that between the Associated Bell Telephone Companies and the parent American Telephone and Telegraph Company. This combination will be taken up in detail.

Payments to the American Telephone and Telegraph Company.—After the Bell Telephone Companies became merged into the American Telephone and Telegraph Company, all the stock of these subsidiary companies was held by the parent company. The subsidiary companies paid to the American Telephone and

¹ *Hooper v. Lassen E. Co. (Cal.)*, P.U.R. 1933B, 277; *Re Gloucester E. Co. (Mass. 1934)*, 4 P.U.R. (N.S.) 342; *Re Great Falls Gas Co. (Mont.)*, P.U.R. 1928E, 804; *Re Western Ohio Pub. Service Co. (Ohio)*, P.U.R. 1931D, 1; *Re Western Ohio Gas Co. (Ohio)*, P.U.R. 1933B, 433.

Telegraph Company a sum of 4.5 per cent of their gross income each year for certain services performed by the American Telephone and Telegraph Company, among which are the following:

The services covered by this agreement include: Telephone instruments, that is, receiver, transmitter, and induction coil, and with these instruments, for no additional charge, the use of a repeater; the use of all patents owned and controlled by the A. T. & T. Co. and the benefit of the research and development work carried on by that company; financial assistance; accounting, legal, traffic, commercial, engineering, and operating advice and assistance, publicity and executive assistance; the right to use all methods, systems, apparatus, and instruments covered by the patents owned and controlled by the A. T. & T. Co., free from any royalty, with the insurance against infringement suits and claim to indemnity in case of adverse claims under patents; advice and assistance in administering the employee's benefit and accident funds; universal connection with all other telephones in the Bell System.—*New York Tel. Co.* (N.Y.), P.U.R. 1923B, 545.

It should be noted from this list that some of these services are in the nature of rental for certain facilities that were furnished to the operating companies; other features are financial in nature, and others are managerial. That these services had value was never denied by any regulatory body, and nearly all commissions allowed the full amount of this charge. In some cases the commissions and courts questioned the amount to be charged, and in a few instances attempts were made to reduce the amount by arbitrary action not based upon any accounting of the costs of the service.¹ In the *Southwestern Bell Telephone Company Case*, the Supreme Court reversed the commission as follows:

The Commission allowed, as an operating expense, the repair cost of receivers, transmitters, and induction coils secured from the parent company, together with 17.5 per cent for depreciation and return on their value, instead of 4.5 per cent of the gross revenue as provided for in the contract with the A. T. & T. Co., the parent company. The United States Supreme Court, Mr. Justice McReynolds voicing the unanimous opinion of the court, held: It must never be forgotten that

¹ *Re Southern California Tel. Co.* (Cal.), P.U.R. 1925C, 627; *Re New England T. & T. Co.* (Mass.), P.U.R. 1927A, 583; *Re Wisconsin Tel. Co.* (Wis.), P.U.R. 1927A, 583; *Re Lincoln T. & T. Co.* (Neb.), P.U.R. 1929E, 33; *New York Tel. Co. v. Prendergast*, 36 F. (2d) 54, P.U.R. 1930B, 35; *Re Mountain States T. & T. Co.* (N.M.), P.U.R. 1923B, 352.

while the state may regulate with a view to enforcing reasonable rates and charges, it is not the owner of the property of public utility companies, and is not clothed with the general power of management incident to ownership.—*State ex rel. Southwestern Bell Tel. Co. v. Missouri Pub. Service Comm.*, 262 U.S. 276, 67 L. ed. 981, 43 Sup. Ct. 544, P.U.R. 1923C, 193.

This matter came up again for review in 1930 in a case brought against the Illinois Bell Telephone Company before the United States Supreme Court. The question arose as to whether interstate and intrastate business must be separated and as to the allowance of the specific findings for cost of the services rendered under the gross revenue fee paid to the American Telephone and Telegraph Company. During the trial of this case in the lower courts, the fee was altered to 1.5 per cent of the gross revenue, and the items covered by this payment were altered. The equipment previously leased by the operating companies from the parent company was transferred to their capital accounts at a fair valuation. Certain other managerial arrangements were omitted, the value of these services being determined from year to year by the parent company and charged to the associated companies on a fair basis. After this decision, the commissions and courts changed their previous rulings to conform with the new decision of the Supreme Court.¹ In addition to this feature, the commissions have fixed an allocation of these charges between operating expenses and capital accounts so that the operating expenses of the subsidiary companies carry much less charge to this item. In addition, an allocation is made for this charge between interstate and intrastate business, so that the toll service now carries its portion of the charge made by the American Telephone and Telegraph Company.² The decision in the Illinois Bell case follows:

Specific findings should be made with regard to cost of services rendered and instruments furnished by a parent company to an operating company under a licensee contract, and as to the reasonable amount

¹ Re Wisconsin Tel. Co. (Wis.), P.U.R. 1931D, 97, 101; Re Chesapeake & Potomac Tel. Co. (D.C.), P.U.R. 1932E, 193; Re Southern Bell Tel. Co. (Ala.), P.U.R. 1932E, 207; *Illinois Bell Tel. Co. v. Gilbert*, 3 F. Supp. 595, P.U.R. 1933E, 301.

² Re Chesapeake & Potomac Tel. Co. (D.C. 1934), 4 P.U.R. (N.S.) 345; Re Southern Bell Tel. Co. (Tenn. 1935), 6 P.U.R. (N.S.) 464.

which should be allocated to the operating expenses of the intrastate business of the utility, in determining whether rates are confiscatory.—*Smith v. Illinois Bell Tel. Co.*, 282 U.S. 1933, 75 L. ed. 265, 51 Sup. Ct. 65, P.U.R. 1931A, 1.

Western Electric Company Contract.—In addition to owning the stock of the Associated Bell Telephone Companies, the American Telephone and Telegraph Company also owns the Western Electric Company. This company was purchased by and became the manufacturer of instruments and equipment for the American Telephone and Telegraph Company and its associated operating companies. The Associated Bell Companies together have a contract with the Western Electric Company for the purchase of all equipment not covered by the contract with the American Telephone and Telegraph Company and also for the warehousing and sale to them of materials and supplies not covered by the license agreement. This contract covers the sale, at cost plus a certain overhead, or handling expense, at prices lower than those at which the same commodities may be purchased from other companies or at which they are sold by the Western Electric Company to other purchasers. In the beginning, the different associated operating companies of the Bell System purchased their equipment, including instruments and switchboards, by competitive bids from various manufacturing companies scattered over the country. As the telephone business developed rapidly, many of these devices became obsolete, and their places were taken by other patented devices which again rapidly became replaced. Finally, the Bell Telephone Companies under the American Telephone and Telegraph Company purchased the Western Electric Company and developed it into a common manufacturing company, later purchasing and consolidating others of the smaller manufacturers. Later the purchase and sale of all supplies for the different subsidiaries under standard specifications were also taken over by the Western Electric Company, and their sale is covered by a uniform contract for all subsidiaries. This agreement has been the source of suspicion and investigation by several of the state commissions.

While not conclusive, the fact that Western Electric sells at slightly higher prices to independents who could buy elsewhere, and that com-

peting manufacturers do not undersell, is powerful evidence that the prices made to Bell companies are not excessive.—*Southwestern Bell Tel. Co. v. San Antonio Tex.* (1935), 7 P.U.R. (N.S.) 433.

This contract was also discussed by the United States Supreme Court in the Illinois Bell Telephone Company Case. That court held that an accounting could and should be made of the cost of these services by the Western Electric Company and that these services should also be properly allocated between interstate and intrastate business. This is an unusual decision in that it authorizes an accounting of the affairs of a manufacturing company as distinct from public utilities. However, it must be understood that the Western Electric Company is part of a large interstate business and that it has a monopoly on all the business of this nature with the subsidiaries of the American Telephone and Telegraph Company.¹ The finding in this case follows: "Findings should be made of the net earnings of a supply company from the manufacture and sale of equipment to an affiliated operating telephone company, in order to determine the fairness of prices paid for equipment in cases involving the adequacy of telephone rates." *Smith v. Illinois Bell Tel. Co.*, *supra*.

Other Management Contracts.—Other holding companies have used managerial contracts with subsidiary operating utilities or have made charges for managerial services similar to those of the American Telephone and Telegraph Company, discussed in the previous sections. These services vary from engineering advice and assistance in the design and construction of the plants to complete services in management, auditing, purchasing supplies and equipment, and numerous other services. Some of these have been allowed as representing a value equal to the charge,²

¹ Re Wisconsin Tel. Co. (Wis.), P.U.R. 1931D, 97; Michigan Bell Tel. Co. v. Odell, 45 F. (2d) 180, P.U.R. 1931E, 222; Re Ohio Bell Tel. Co. (Ohio), P.U.R. 1932D, 33; *id.* (Ohio), 1934, 2 P.U.R. (N.S.) 113; Re Chesapeake & Potomac Tel. Co. (D.C. 1934), *supra*; Re New York Tel. Co. (N.Y.), P.U.R. 1923B, 545; Re Cumberland T. & T. Co. (La.), P.U.R. 1922E, 86; Re New England T. & T. Co. (N.H.), P.U.R. 1926E, 186.

² Colorado Springs L. H. & P. Co. (Colo.), P.U.R. 1916C, 464; Re Red River P. Co. (N.D.), P.U.R. 1923E, 534; Re New York State E. & Gas Corp., 146 Misc. 560, 264 N.Y. Supp. 97, P.U.R. 1933D, 140; Wood v. Elmira Water L. & R. Co. (N.Y.), P.U.R. 1927B, 400; Re Gary R. Co. (Ind.), P.U.R. 1931D, 455; Re Grays Harbor R. & L. Co. (Wash.), P.U.R. 1932D,

others have been scaled down to agree more nearly with the value of the service received, and still others have been entirely disallowed.¹ In some states new statutes require that the commission shall investigate all such contracts and disallow them if they do not prove to be of real value to the operating company commensurate with the charge.²

Commodity Cost.—The case of commodity costs where no intercorporate relations are involved was considered in a preceding section of this chapter. In the case of companies in which there are intercorporate relations, there can be no arm's-length contract for this service, and the regulating body scrutinizes the cost of service whenever it is possible.³ Previous to the Western Distributing Company Case, the commission could not make any accounting of pipe-line or transmission companies as to the gate rates for the cities receiving natural gas from their pipe lines, even when the operating company distributing this gas was owned by the same holding company as that which transmitted the gas.⁴

140; *Re Billings Gas Co. (Mont.)*, P.U.R. 1933D, 337; *Re San Diego Consol. Gas & E. Co. (Cal. 1935)*, 7 P.U.R. (N.S.) 443.

¹ *Re Belvidere Water Co. (Cal.)*, P.U.R. 1917A, 210; *Dunn v. Rutland R. L. & P. Co. (Vt.)*, P.U.R. 1923C, 316; *Re Wisconsin-Minnesota L. & P. Co. (Wis.)*, P.U.R. 1920D, 428; *Re Helena L. & R. Co. (Mont.)*, P.U.R. 1920D, 668; *Re Cumberland & Allegheny Gas Co. (W. Va.)*, P.U.R. 1928B, 22; *Re Wisconsin Pub. Util. Co. (Wis.)*, P.U.R. 1929E, 119; *Re Johnson County Tel. Co. (Ind.)*, P.U.R. 1931A, 446; *Re Chambersburg Gas Co.*, 116 Pa. Super. 196, 176 Atl. 794 (1935), 7 P.U.R. (N.S.) 359; *Municipal Gas Co. v. Wichita Falls (Tex. 1935)*, 9 P.U.R. (N.S.) 33.

² *Re Loogootee Water Co. (Ind.)*, P.U.R. 1932C, 494; *Re Northwestern E. Co. (Ore.)*, P.U.R. 1933B, 41; *Re New Bedford Gas & E. Co. (Mass.)*, P.U.R. 1933D, 256; *Re West Coast P. Co. (Wash. 1934)*, 5 P.U.R. (N.S.) 204; *Re Red River P. Co. (N.D. 1935)*, 8 P.U.R. (N.S.) 225; *Re Rockford Gas L. & Coke Co. (Ill.)*, P.U.R. 1920E, 461; *Re Houghton County E. L. Co. (Mich.)*, P.U.R. 1924B, 321; *Re Western States Gas & E. Co. (Cal.)*, P.U.R. 1924D, 691; *Re Alabama P. Co. (Ala.)*, P.U.R. 1932E, 323; *Re Kentucky-Tennessee L. & P. Co. (Tenn.)*, P.U.R. 1932E, 385; *Re Cities Service Co. (Kan.)*, P.U.R. 1933A, 113; *Wichita Gas Co. v. Public Service Comm.*, 2 F. Supp. 792, P.U.R. 1933B, 225; *Re Broad River P. Co. (S.C.)*, P.U.R. 1933C, 351.

³ *Herman v. Newton Gas Co. (N.Y.)*, P.U.R. 1916D, 825; *Re Clarksburg L. & H. Co. (W. Va.)*, P.U.R. 1917A, 577.

⁴ *Wichita Gas Co. v. Public Service Comm.* 126 Kan. 220, 268 Pac. 111, P.U.R. 1928D, 136; *Columbus Gas & Fuel Co. v. Public Service Comm.*, 55 F. (2d) 56, P.U.R. 1932B, 4; *Re Central Kentucky Natural Gas Co.*, 60 F. (2d) 137, P.U.R. 1932E, 70; *Kansas Pub. Service Comm. v. Cities Service*

Similar relations hold between companies transmitting electricity and selling it to affiliated distributing companies or for telephone systems not affiliated with the American Telephone and Telegraph Company.¹ When the gas or electricity is produced in another state, there is still a point at which it is difficult for a state commission to determine the production and transmission costs. In one case this distinction was made by cooperation between the commissions in two states in which the same transmission company operated. The valuation of the producing and transmitting property in one state was taken by the commission in the adjacent state as its rate base for the determination of gate rates for cities in the second state.

Three citations from cases decided by the United States Supreme Court and including that of the Western Distributing Company are given below:

A subsidiary distributing gas utility before being allowed an increase in rates for its service to the public may properly be required to offer satisfactory evidence with respect to all costs which enter into the ascertainment of a reasonable rate, including reasonableness of rates paid to a wholesale affiliated supply company under a contract which was entered into in the absence of an "arm's length" bargain between the two corporate entities involved. A state Commission is entitled to a fair showing of the reasonableness of the price paid by a distributing utility for gas to an affiliated wholesale supply company, even though it may involve such representation of evidence as would not be required in the case of parties dealing at arm's length.—*Western Distributing Co. v. Kansas Pub. Util. Comm.*, 285 U.S. 119, 76 L. ed. 655, 52 Sup. Ct. 283, P.U.R. 1932B, 236.

There was no error in the determination by a state Commission that evidence was inconclusive to show the reasonableness of the price paid by distributing utilities to an affiliated seller for natural gas supply on the theory that the price was the customary charge as shown by numerous contracts most of which were apparently with an affiliated corpora-

Co. (Kan.), P.U.R. 1933A, 113; *Wichita Gas Co. v. Public Service Comm.*, 2 F. Supp. 792, P.U.R. 1933B, 225.

¹ *Re Lone Star Gas Co.* (Okla.), P.U.R. 1933C, 1; *Re Billings Gas Co.* (Mont.), P.U.R. 1933D, 337; *State ex rel. Steiger v. Capital Gas & E. Co.*, 139 Kan. 870, 33 P. (2d) 731 (1934), 5 P.U.R. (N.S.) 129; *Re Reading Traction Co.* (Pa.), P.U.R. 1922A, 346; *Wabash Valley E. Co. v. Singleton*, 1 F. (2d) 106, P.U.R. 1932B, 225.

tion, prices not being uniform and distances and other geographical conditions affecting the cost of transportation and delivery being undescribed and unexplained.—*Dayton P. & L. Co. v. Ohio Pub. Service Comm.*, 292 U.S. 290, 78 L. ed. 1267, 54 Sup. Ct. 647 (1934), 3 P.U.R. (N.S.) 279.

An intercorporate agreement between a gas distributing company and an affiliated wholesale company does not control the price to be paid by consumers if the rate thereby established is higher than a fair return. *Columbus Gas & Fuel Co. v. Ohio*, 292 U.S. 290, 78 L. ed. 1267, 54 Sup. Ct. 647 (1934), 3 P.U.R. (N.S.) 279.

Other Payments to Holding Companies.—Other payments by subsidiaries to holding companies include payments for accounting services,^{1,2} salaries of holding company officers either connected directly or indirectly with the company,³ payments for group purchases of supplies and equipment,⁴ and other types of management fee. These payments were allowed to be charged to the operating expenses in earlier cases, but more recently the tendency has been to allow only such of these expenses as may be proved to be of value to the subsidiary company and in the amount of the value approved.² In some states laws have been passed requiring the commission to reject all such payments until they are fully proved to the satisfaction of the commission. In Alabama salaries of some officers of a holding company were added to the pay rolls of the operating company although these officers resided in another state, their services being of value to the subsidiary.

Commission and Legal Expenses. *Legal Expenses.*—Ordinary legal expenses due to operation are chargeable to the operating expenses, provided that these legal expenses are incurred on account of operation rather than construction, in which latter case they should be included in the rate base. Legal expenses incurred in the preparation and presentation of rate cases before the commission are usually allowed and amortized over a period of 3 to 5 years. However, in case the commission decides that

¹ Re Salamonina Tel. Co. (Ind.), P.U.R. 1930E, 39.

² Re Portland Water Co. (Conn. 1934), 4 P.U.R. (N.S.) 265; Re Yonkers E. L. & P. Co. (N.Y. 1936), 15 P.U.R. (N.S.) 89.

³ Re Alabama Water Supply Co. (Ala. 1934), 1 P.U.R. (N.S.) 166.

⁴ Re New Hampshire Gas & E. Co. (N.H.), P.U.R. 1931D, 225.

the rates being charged are excessive and a reduction is ordered, these fees are not allowed.¹

Commission Expenses.—In states having a regulatory commission, it is customary to charge each utility an annual amount for the support of this commission. Such an annual charge is allowed in the operating expenses of each utility.² When a commission is required to make a special investigation of a utility, in order to determine its proper rate structure, the costs of the commission for legal, engineering, and accounting services may also be assessed against the utility. Such expenses, being only occasional in character, are amortized over some period as 5 to 10 years, a term commensurate with the probable duration of the rate structure.

For expenses incurred by the utility in the preparation of its case and its presentation before the commission, this is allowed only if the rates are determined to be correct or are increased. In these cases the cost is amortized over a period of 3 to 10 years.³ Where the rates are found to be too high, the costs are either reduced or are not allowed at all.⁴ In one case a claim was made by a city for reimbursement of its expenses in preparation of a rate case, the amount to be paid by the utility. This was denied by the commission.⁵ The United States Supreme Court has decided in favor of an allowance for such expenses in the following:

"A gas utility is entitled to an allowance of the expenses of its successful attack upon a rate ordinance before a state Commission, including

¹ *Fort Wayne v. Home T. & T. Co. (Ind.)*, P.U.R. 1920D, 83; *Kings County L. Co. v. Lewis*, 110 Misc. 204, 190 N.Y. Supp. 570, P.U.R. 1920D, 145; *Re Helena L. & R. Co. (Mont.)*, P.U.R. 1920D, 668; *Ex parte Lexington Tel. Co. (Va.)*, P.U.R. 1929E, 51.

² *Wisconsin Tel. Co. v. Wisconsin R. Comm.*, 206 Wis. 589, 240 N.W. 411, P.U.R. 1932B, 195.

³ *Re Clinton County Tel. Co. (Mo.)*, P.U.R. 1928B, 796; *New York Tel. Co. v. Prendergast*, 36 F. (2d) 54, P.U.R. 1930B, 35; *Re Wabash Valley E. Co.*, 1 F. Supp. 106, P.U.R. 1932B, 225; *Ex parte Lexington Tel. Co. (Va.)*, P.U.R. 1929E, 51; *Re Seattle Gas Co. (Wash. 1934)*, 3 P.U.R. (n.s.) 433.

⁴ *Re Cumberland & Allegheny Gas Co. (W. Va.)*, P.U.R. 1928B, 23; *Re Logansport Home Tel. Co. (Ind.)*, P.U.R. 1928E, 715; *Scranton-Spring Brook Water Supply Co. v. Public Service Comm.*, 105 Pa. Super. 203, 160 Atl. 230, P.U.R. 1932C, 471; *Re Chesapeake & Potomac Tel. Co. (Va.)*, P.U.R. 1926E, 485.

⁵ *Wheeling v. Natural Gas Co. (W. Va.)*, P.U.R. 1933D, 1; *Farm Bureau Federation v. San Joaquin L. & P. Co. (Cal.)*, P.U.R. 1932D, 310.

charges of engineers and counsel, in the absence of evidence of improvidence, and the amount of such allowance may be spread over the period during which rates are to be effective." *Re West Ohio Gas Co.*, 294 U.S. 63, 55 Sup. Ct. 316. "The refusal of the Secretary of Agriculture to include rate case expenses as an operating charge of a stockyards operator was held to be erroneous." *Denver Union Stockyards Co. v. United States*, 57 F. (2d) 735, P.U.R. 1932C, 225. "In *Charlotte, C. & A. R. Co. v. Gibbs* (1892) 142 U.S. 386, 12 Sup. Ct. 255, the Supreme Court approved a law of the state of South Carolina imposing on railroads of that state the cost of their regulation by the Railroad Commission."

"A state imposing fees on interstate railroads to meet the cost of inspection and regulation has failed to carry the burden of showing that the sums exacted from such a railroad did not exceed what was reasonably needed for the service rendered when the evidence was uncontradicted and conclusive that amounts expended for railroad accounts included substantial and apparently large amounts for activities in the interest of interstate shippers and for the trial of reparation cases." *Great Northern R. Co. v. Washington* (1937), 17 P.U.R. (N.S.) 475.

Reserves and Special Funds. *Reserve for Depreciation.*—In the chapters on depreciation, the necessity of a provision for a reserve for depreciation is pointed out. This reserve is built up by annual deposits which are charged to operating expenses. Methods of arriving at the amount of the annual charge were determined in those chapters. Approval by the commission for charging this annual amount is, therefore, necessary to carry out this provision.^{1,2} When the utility has neglected to provide such a fund in the past, it is not permitted to set aside an extra amount for this purpose against future operating expenses. It should charge only the amount that would be approved if such a fund were present. The reserve should then be reimbursed from surplus already in the hands of the utility or by an annual charge against the net return until the fund is finally brought to the proper level,³ unless the absence of the fund is chargeable to the action of the commission in making the rates too low to permit the annual allowance. This annual allowance should be placed

¹ *Meade Coal Co. v. Appalachian P. Co.* (W. Va.), P.U.R. 1923E, 221.

² *Puget Sound E. R. Co. v. R. Comm.*, 65 Wash. 75, 117 Pac. 739.

³ *Re Rates for Gas in 31st Ward*, 4 P.S.C. N.Y. (1st Dist.) 328.

to the credit of the reserve before any provision is made for dividends. In a few cases provision is made for a single charge for maintenance and depreciation.¹

Amortization of Losses.—Losses covered under this title are those caused by rates fixed too low by the commission, by the abandonment of property, by consolidation of property, and by the item of deferred maintenance.

LOSSES DUE TO RATES FIXED BY THE COMMISSION.—Temporary and trial rates fixed by a commission are sometimes too low to bring in a sufficient return. After a fair trial, the utility may petition the commission for a rehearing and for new rates which will not only produce a fair return but which will also amortize the losses in past operation. In general, the period of recoupment of the losses should be equal to the period over which the losses took place.²

LOSSES CAUSED BY ABANDONMENT OF PROPERTY.—Losses are sometimes caused by unforeseen occurrences that are not the fault of the utility. Such losses may be caused by the abandonment of electrical equipment on account of a change from direct to alternating current, an abnormal amount for repairs and replacements of water mains or other underground structures on account of extensive street improvements and changes in street levels,³ abandonment of property on account of a change in health or other ordinance requirements in the city, abandonment of tracks and other structures of a railroad on account of extensive grade separation requirements, and other causes of this nature. Changes of telephone equipment caused by change from manual to automatic equipment⁴ or from desk sets to hand sets⁵ are considered, and the portion of the equipment not covered by salvage for use in other places may be amortized. Surrendered leaseholds, abandoned gas wells and lines, and superseded property of other utilities may also be amortized, provided that they have

¹ *Illinois Commerce Comm. v. Chicago Tel. Co. (Ill.)*, P.U.R. 1924A, 215.

² *Re Indiana Fuel & L. Co. (Ind.)*, P.U.R. 1920A, 414; *Re Columbus Gas L. Co.*, 193 Ind. 399, 140 N.E. 538, P.U.R. 1923E, 602; *Louisiana Water Co. v. Public Service Comm.*, 294 Fed. 954, P.U.R. 1924C, 293; *Re Michigan State Tel. Co. (Mich.)*, P.U.R. 1920C, 545; *Re Coast Gas Co. (N.J.)*, P.U.R. 1923D, 352.

³ *Re Johnstown Tel. Co. (Pa.)*, P.U.R. 1929D, 11.

⁴ *Re Illinois Bell Tel. Co. (Ill.)*, P.U.R. 1930B, 455.

⁵ *Re Handset Telephones (Ga. 1934)*, 3 P.U.R. (n.s.) 50.

not been retained too long by the utility.¹ However, a bridge² and a hydroelectric dam³ which were serving their proper purposes but which might have to be abandoned at the termination of a franchise or charter were not permitted to be amortized from operating expenses.

LOSSES CAUSED BY CONSOLIDATION OF PROPERTY.—These losses may be caused by an excess price paid for property purchased by a holding company upon consolidation of several smaller properties into a larger combined system or by the purchase of one or more competing utilities in a given city and consolidation into a single system. Such consolidation requires the abandonment of certain facilities of the less efficient units of the combined property. Such property is usually amortized out of the savings resulting from the consolidation.⁴

Ordinarily, deferred maintenance, caused by negligence on the part of the utility, cannot later be charged to the depreciation reserve, capitalized, or amortized out of expenses. Deferred maintenance not the fault of the utility should ordinarily be allowed to be amortized at a later date, although this was not done in the *Galveston Electric Case*: "In determining whether a rate is confiscatory, a street railway company should not be allowed as an operating expense an amount for the amortization of maintenance deferred during the war period." *Galveston v. Galveston E. Co.*, 258 U.S. 388, P.U.R. 1922D, 159.

In the case of the *Seattle Gas Company*, "the cost of rebuilding gas meters, which have to be entirely replaced after 20 years, was charged to the depreciation reserve as the repairs extended the actual life of the meters, and was not an annual item." *Re Seattle Gas Co.* (Wash. 1934), 3 P.U.R. (N.S.) 433.

Payments to a Sinking Fund.—Sometimes it is desirable for a utility to establish a special sinking fund to take care of fluctua-

¹ *Oklahoma Natural Gas Co. v. Oklahoma Corp. Comm.*, 90 Okla. 84, 216 Pac. 917, P.U.R. 1924A, 134; *Re Jackson County L. H. & P. Co. (Mo.)*, P.U.R. 1926D, 738; *Re Eastern Shore Gas & E. Co. (Me.)*, P.U.R. 1929E, 738; *Re Southern Illinois L. & P. Co. (Ill.)*, P.U.R. 1920B, 694.

² *Department Pub. Works v. Pacific County Bridge Co. (Wash.)*, P.U.R. 1922D, 280.

³ *Re Tennessee E. P. Co. (Tenn.)*, P.U.R. 1930E, 312.

⁴ *Re Wisconsin Tel. Co. (Wis.)*, P.U.R. 1927A, 582; *Re San Joaquin L. & P. Corp. (Cal.)*, P.U.R. 1933E, 128; *Re Citizens Independent Tel. Co. (Ind.)*, P.U.R. 1929E, 432.

tions in operating costs and income. Such a reserve was defined by Nash as a "barometer fund": "A *barometer fund* is a fund or reserve derived from rates and maintained for the purpose of preventing frequent rate changes which might otherwise be required when costs fluctuate." Nash on Economics of Public Utilities, 1st ed., p. 40. Payments into a sinking fund to a city, which has the optional right to use the fund to purchase the utility property, under a contract which provided that the payments shall be treated as fixed charges, should be made out of the return.¹

Allowance for Insurance.—Premiums for insurance are held to be a necessary cost of operation for a public utility. This includes liability insurance, if actually paid, as well as insurance for fire and windstorms.² The utility should not attempt to assume its own risk in this respect, for service to its customers, as well as the safety of the investment, depends upon the financial ability of the company to perform its functions.³ Taxicabs and other motor vehicles operating on the streets for hire or in the employment of the utility should also carry sufficient liability insurance to protect the public in case of accident to persons or property. In some instances cab, bus, and trucking companies are required by law to carry a bond to cover this type of loss, as well as the liabilities for performance of their duties as common carriers.⁴ However, burglary loss not covered by insurance was not allowed.⁵

Losses from Storms, Floods, and Extraordinary Expenses.—There are always accidents that are unavoidable in the operation of any large company. Many of the utility enterprises have special hazards attached by the nature of the business. Among these are the hazards of the electrical business due to the fact

¹ Re Philadelphia Rapid Transit Co. (Pa.), P.U.R. 1926B, 385; Re New England T. & T. Co. (Mass.), P.U.R. 1926E, 187; Re Los Angeles Gas & E. Corp. (Cal.), P.U.R. 1931A, 132.

² Re Wisconsin L. & P. Co. (Wis.), P.U.R. 1919B, 224; Re Napa Valley E. Co. (Cal.), P.U.R. 1925A, 724; Miles v. Peoples Tel. Co., 166 Wis. 94, 163 N.W. 652, P.U.R. 1917F, 175; Maires v. Flatbush Gas Co. (N.Y. 1st Dist.), P.U.R. 1920E, 930.

³ New Orleans Livestock Exchange v. Texas & P. R. Co., 10 I.C.C. 327.

⁴ Re Liability Insurance for Taxicabs and Public Cars (Neb.), P.U.R. 1929D, 561.

⁵ Municipal Gas Co. v. Wichita Falls (Tex.), P.U.R. 1925B, 410.

that the employees must come in contact with dangerous voltages. No matter how good the insulation, accidents will happen. Carelessness on the part of one employee may endanger the life or limb of another working with or near him. By law, the company is liable for these accidents of a personal-injury nature even if caused by an employee and not the fault of the company itself. This loss may be protected by liability insurance. However, accidents to persons not employees of the company, traveling on the company's cars or coming in contact with the company's lines, will have to be paid by the company itself. The question arises as to whether these expenses are legitimate operating expenses of the year incurred or whether they must be paid for out of the net income of the company and be borne by the stockholders.^{1,2}

Accidents to equipment of the company due to unforeseen circumstances are bound to occur, and these accidents may spread to a considerable part of the equipment and cripple the service of the company. Some of these expenses may be met from the depreciation reserve created for the purpose.^{3,4} The question arises in this connection as to whether payments into a reserve of this character should come from the net earnings or from the operating expenses of the company and thus be borne by the rate payers. In general, extraordinary expenses for repairs that do not occur annually should be amortized over a period of their probable occurrence;⁵ the cost of cleaning wells of a water utility, extraordinary expenses due to freezing of water mains during an unusually severe winter,⁶ the cost of repairs caused by a leak in a dam,^{7,8} and losses due to severe floods or windstorms, and not covered by insurance, may be amortized over a period of years or else paid for from a reserve established for that purpose.

¹ *Consumers v. Springfield Gas Co.*, 9 Mass. Gas & E. L. Comm'rs 6.

² *Nunn v. Sutter-Butte Canal Co.* (Cal.), P.U.R. 1918E, 563.

³ *Re Boone County Tel. Co.* (Ark. 1934), 4 P.U.R. (N.S.) 121.

⁴ *Maires v. Flatbush Gas Co.* (N.Y. 1st Dist.), P.U.R. 1920E, 930; *Brooklyn Union Gas Co. v. Prendergast*, 7 F. (2d) 628, P.U.R. 1926A, 412.

⁵ *Re Laporte County Independent Tel. Co.* (Ind.), P.U.R. 1930B, 131.

⁶ *Bingham Water Co. v. Itself* (Me.), P.U.R. 1920F, 209.

⁷ *Re Litchfield Water Supply Co.* (Ill.), P.U.R. 1920D, 332.

⁸ *Herring v. Clark's Ferry Bridge Co.* (Pa.), P.U.R. 1926D, 516.

The cost of repairing the damage caused by the flood must be met, and while part of the loss probably could be charged to depreciation, thus permitting the company to capitalize to this extent at least indebtedness properly incurred for additions and replacements necessary by reason of the flood, that which could not be met in this way must be met from earnings or other cash resources, and allowance therefor must be made in determining rates. It was considered, however, that all of the loss could not be provided for through earnings in one year, and the amount was spread over several years.—*Mayor and Aldermen of Lawrence v. Lawrence Gas & E. Co.* (Mass. 1936), 15 P.U.R. (N.S.) 353.

Contributions to Charities and Dues to Clubs.—The general rule is that contributions made by utilities for various purposes are not a charge to operating expenses. It has been held that customers should not be required to bear the burden of charitable donations but that these should be paid from the net earnings or the profits of the business. Emergency donations, caused by war or catastrophes, should be excluded from the operating expenses because the consumer, having made his own donations, should not be burdened with those of the public utility. In regard to dues to clubs and other organizations, it has been held that only such dues should be included as result in actual benefits to the consumers rather than to the stockholders.¹

Charges to picnics, photographs of employees, rodeo stock, charitable organizations, magazines, and newspapers, floral pieces, and music, while commendable, should not be imposed on the rate payers unless it be shown that they were incurred in the service of and for the benefit of the patrons of the company.—*Reno P. L. & W. Co. v. Public Service Comm.*, 298 Fed. 790, 300 Fed. 645, P.U.R. 1923E, 485.

Losses in Operation.—Three types of loss may be considered under this heading: losses from uncollectible accounts, losses in distribution, and improvident contracts. The first of these losses is the most general and important in modern utilities. It has been ruled by various commissions that utilities must use

¹ Re Springfield Gas & E. Co. (Ill.), P.U.R. 1920A, 446; Re Indianapolis Water Co. (Ind.), P.U.R. 1925C, 431; Re Southern Indiana T. & T. Co. (Ind.), P.U.R. 1927A, 434; Re Citizens Independent Tel. Co. (Ind.), P.U.R. 1929E, 431; Re Lone Star Ice Co. (Okla.), P.U.R. 1933C, 1; Re Louisville Hydro-electric Co. (Fed. P.C. 1934), 1 P.U.R. (N.S.) 454; Re Seattle Gas Co. (Wash. 1934), 3 P.U.R. (N.S.) 433; *West Ohio Gas Co. v. Public Service Comm.*, 294 U.S. 79, 79 L. ed. 761, 55 Sup. Ct. 316 (1935), 6 P.U.R. (N.S.) 449.

more than ordinary diligence and judgment in collecting their accounts.¹ Most utilities require a deposit by the customers before service is begun, especially in the case of new customers who do not have a good credit rating or who are unable to secure someone whose credit has been already established to guarantee the payment of their bills. Interest is paid on deposits at the end of each year, and, after the customer's credit has been established or after he ceases taking service, the deposit is returned to him.² Under the heading of Service, it will be shown that a utility has the right to disconnect a customer for non-payment of bills after proper notice has been given by the company and if there is no dispute about the bill. This helps to protect the utility against considerable losses from bad bills. When a deposit is required, the commissions do not usually permit any charge for bad bills to the operating expenses.^{2,3,4} In some cases, the amount permitted has been reduced from that requested by the utility.

Expense of Merchandising.—In the case of transportation utilities, the transportation service that is rendered is what is paid for by the customer; similarly with a water utility. With the gas and electric utilities, appliances must be purchased and attached to the service connections in order for the customer to make use of the commodity or service furnished by the utility. Gas burners, ranges, water heaters, and house-heating devices are attached to the gas service lines. Lights, ranges, toasters, flatirons, vacuum cleaners, radios, motor-driven appliances such as washing machines and oil burners, and many other appliances are necessary adjuncts to the full use of electricity in the home. Gas and electricity are not complete services in themselves but require special appliances to perform their functions. Without equipment of this kind in the possession of the customers, there would be no sale of gas or electricity for household purposes.

Electrical and gas appliances fall into several broad classifications, *viz.*, (1) those appliances on which the profit on the sale

¹ *Libby v. Libby Water & E. Co. (Mont.)*, P.U.R. 1922E, 402.

² *Re Southside Waterworks Co. (W. Va.)*, P.U.R. 1920D, 752.

³ *Re Reno P. L. & W. Co.*, 298 Fed. 790, 300 Fed. 645, P.U.R. 1923E, 495; *Re Cumberland & Allegheny Gas Co. (W. Va.)*, P.U.R. 1928B, 22; *Re Alexandria Water Co. (Va.)*, P.U.R. 1932C, 342.

⁴ *Re Kennebunk, K. & W. Water Dist. (Me.)*, P.U.R. 1932E, 313; *Re Pawnee Tel. Co. (Neb.)*, P.U.R. 1923C, 100.

offers a sufficient motive for a dealer aggressively to push the sale and (2) those appliances on which the profit on the sale is very small. Both of these classes can again be subdivided into those requiring a considerable amount of gas or electricity for their operation and those which do not, with all manner of gradations between these two classes. The first of these two broad classes offers no problem to the utility, but the second one does. Even a brief discussion covering the controversial points in connection with merchandising operations of utilities is beyond the scope of this text; suffice it to say that aggressive sales of appliances by utilities have been and still are a necessary adjunct of the business, despite the resolutions of dealers and anti-merchandising statutes passed by some states. Many utilities in the past have sold merchandise below the fair retail sale price or have used other methods to attract purchasers. This action brought retaliation by the smaller dealers, who claimed that it constituted unfair competition, and finally resulted in sufficient pressure upon some state legislatures for them to pass laws prohibiting the sale of appliances by utilities.

The reason leading up to the passage of these laws was faulty, as was amply demonstrated in those states where the utilities ceased merchandising. To assume that the sale of appliances by a utility deprives a dealer of making the same number of sales is fallacious, for (1) a particular customer may not wish to purchase from anyone except the utility; and (2) the number of customers purchasing from a utility is only a small percentage of the total customers who are prospective buyers, and the possession of the appliance by one customer may induce his friends to desire the same kind of appliance, many of these friends purchasing their appliances from dealers. After each customer possesses a certain appliance and future sales become replacements, the dealer stands the same chance as the utility in making the sale, unless the utility resorts to price cutting.

Where fair practices are maintained, there is little cause for a misunderstanding between dealers and utilities, because the more outlets for sale of appliances, the greater should be the total sales; the utility is thus benefited by the sale of more gas or electricity and the dealer is benefited by greater merchandise sales. Also, the aggressive introduction of new devices by the utility will be reflected later by the sales of the same kinds of appliances by the

dealers. Again both will benefit by co-operation in place of misunderstandings. From the point of view of the utility, the cost of rendering service to residence users is affected more by the fixed charges on equipment installed by the utility than by the production cost. With greater use of the product, the cost per unit of product sold decreases as the number of units sold becomes greater. Hence the desirability of increasing the sales of appliances that consume greater units of the product over longer hours of the day, so as to reduce the rates for gas and electricity to as many users as possible.

One of the earliest states to pass laws forbidding the sale of appliances by utilities was the state of Kansas. The Kansas Supreme Court declared this law unconstitutional in the following decision:

Where a public utility corporation is authorized to do business in Kansas in the manufacture, purchase, supply, and distribution of artificial and natural gas, the sale of gas appliances by it, under the facts and circumstances set forth in this opinion, is intimately connected with and incidental to the sale and distribution of gas, and is an implied power of such company because it directly and proximately tends to accomplish the general purpose for which the company was incorporated. Chapter 230 of the Sessions Laws of 1931 (prohibiting merchandising activities by utilities) is unconstitutional and void because it is in violation of the 14th Amendment of the Constitution of the United States in that it denies to certain individuals, firms, and corporations the legal protection of the law.—*Capital Gas & E. Co. v. Boynton*, 137 Kan. 717, 22 P. (2d) 958, P.U.R. 1933D, 435. See also the earlier decision of *Malone v. Lancaster Gas, L. & F. Co.* (1897), 182 Pa. 309, 37 Atl. 932.

This decision and that of the Pennsylvania Supreme Court have caused a repeal of such laws and the withdrawal of similar laws in other states. However, the commissions have ruled that expenses of merchandising as well as the income from this department must be kept in accounts separate from regular utility operations.¹

¹ Re Accounting for Merchandising and Appliance Sales (Wis.), P.U.R. 1930E, 204; *Elko v. Elko-Lamoille P. Co.* (Nev.), P.U.R. 1931C, 14; *Lucky, Platte & Co. v. Central Hudson Gas & E. Co.* (N.Y.), P.U.R. 1932B, 165; *Re Western Ohio Pub. Service Co.* (Ohio), P.U.R. 1931D, 1; *Re Cheyenne L. F. & P. Co.* (Wyo.), P.U.R. 1930E, 114; *Re Broad River P. Co.* (S.C.),

The cost of demonstrating electrical appliances should not be allowed as an operating expense, since it is assumed the company makes a profit on its sales of appliances, and the complete selling cost should be included in the price at which the appliances are sold instead of being charged against all customers in their bills for electric current.—*Re Potomac Edison Co.* (Md. 1935), 7 P.U.R. (N.S.) 135.

Political Expenditures.—It is natural to expect that political expenditures, such as those for lobbying, should not be approved by regulatory bodies for payment from operating expenses of utilities. Such expenses, if permitted, should be borne by the stockholders.¹ The following citations cover this item:

"Expenditures for the maintenance of lobbies should be excluded in determining the reasonable cost of public service." *Edison Electric Ill. Co.* (Mass.), P.U.R. 1918C, 149. "Expenses which are mere 'lobbying' expenses should be denounced as perverse of decent morals and good government." *Re Lone Star Gas Co.* (Okla.), P.U.R. 1933C, 1. "The Oregon Public Utility Commissioner excluded from the operating expenses of a public utility expenditures for political purposes." *Re Mountain States P. Co.* (Ore. 1934), 3 P.U.R. (N.S.) 29. For a similar decision see *Mobile Gas Co. v. Patterson* (U.S.D.C. 1923), P.U.R. 1924B, 644; *Re Southern California Edison Co.* (Cal.), P.U.R. 1924C, 1; *Re Western Electric Co.* (N.D.), P.U.R. 1921E, 569. "The commission directs that expense vouchers of officers, employees, and representatives of the company shall detail the daily expenses for (a) transportation from one city, town or community to another, (b) local transportation within the community, (c) lodging, (d) meals, (e) telephone and telegraph and (f) other expenses. Other expenses of more than one dollar a day or in excess of one dollar as a single payment shall be explained in detail. When expenditures are made for services of individuals, other

P.U.R. 1933C, 351; *Re Consumers Edison E. Ill. Co.* (Mass. 1934), 5 P.U.R. (N.S.) 369; *Municipal Gas Co. v. Wichita Falls* (Tex. 1935), 9 P.U.R. (N.S.) 33; *Idaho P. Co. v. Thompson*, P.U.R. 1927D, 388; *Re Kootenai P. Co.* (Idaho), P.U.R. 1923C, 159; *Re Plymouth E. L. Co.* (N.H.), P.U.R. 1922B, 467; *Re Bismarck Gas Co.* (N.D.), P.U.R. 1920F, 1014; *Re Telluride P. Co.* (Utah), P.U.R. 1922B, 168; *Re Southern Counties Gas Co.* (Cal.), P.U.R. 1921E, 374; *Re New Hampshire Gas & E. Co.* (N.H.), P.U.R. 1931D, 225; *Re Broad River P. Co.* (S.C.), P.U.R. 1933C, 351.

¹ *New York & Richmond Gas Co. v. Prendergast*, P.U.R. 1925E, 19; *La Junta v. Arkansas Valley R. L. & P. Co.* (Colo.), P.U.R. 1916D, 1076; *Re Edison E. Ill. Co.* (Mass.), P.U.R. 1918C, 149; *Re Lone Star Gas Co.* (Okla.), P.U.R. 1933C, 1; *Re New York State E. & Gas Corp.* (N.Y. 1937), 20 P.U.R. (N.S.) 388.

than what may be classed as 'tips,' for reports, copies of legislative bills, and similar purposes, there shall be a detailed itemization of (a) to whom payments were made, (b) whose services were received, (c) description of services, reports, etc. and (d) the cost thereof." *Re Wisconsin Tel. Co. (Wis.)*, P.U.R. 1933C, 282.

Conclusions.—The general theme appears to be that ordinary expenses recurring from month to month or from year to year should be charged as they occur and that when some larger nonrecurring expense is necessary it should be charged to surplus or to the depreciation reserve or be amortized over several years, whichever is the appropriate method to use.

Also, donations to organizations from which the utility receives no direct benefit should not be included as an operating expense. Only those items of expense which are directly necessary or beneficial are allowed, and all others which are of a questionable nature may be allowed partly or not at all as determined after careful scrutiny. The method of determining whether expenses are necessary and if necessary whether they are reasonable hinges on comparisons with similar expenses of other utilities, nature of the work or service performed, and other factors having a bearing on the situation.

In order to compare the expenses of one utility with those of another, it is essential that the accounts be kept on a uniform basis, so that the same functions will be charged to the same account. The generation of electricity or manufactured gas seems to be a distinct function and, therefore, directly comparable with similar expenses of other utilities. When generation is accomplished by several methods such as by hydroelectric and steam generating plants with great fluctuation in hydroelectric generation from month to month, a similar fluctuation in steam generation results; so a comparison of steam generating costs of such a utility with a utility using only steam generating equipment must be made with caution. Likewise, distribution costs may be affected by the character of the soil, deterioration of pipes and rotting of poles, costs of competitive fuels for heating and cooking, income of the people, etc., so that, here again, a direct comparison may result in wrong conclusions unless proper weight is given to all factors.

The Federal Power Commission adopted a uniform classification of accounts for electric utilities on Jan. 1, 1937. Under

operating expense accounts, there are specified the following main accounts:

- A—Electric-generating expenses
- B—Transmission expenses
- C—Distribution expenses
- D—Customers' accounting and collecting expenses
- E—Sales-promotion expense
- F—Administrative and general expenses.

Each of these main accounts is again divided into numerous subaccounts. Each of the first three of the preceding main accounts has three general sections, *viz.*, operation, maintenance, and miscellaneous. Each of these has a number of subaccounts relating to the several items constituting the various units in the account covered. Under generating expense is a fourth item to take care of purchased power, interchange power, and other items not properly included in operation, maintenance, or miscellaneous, for generating may be accomplished by steam, hydroelectric, or internal-combustion engines.

In comparing the operating expense accounts of several utilities, one may find a considerable variation because of local conditions. Also, when the same person does work chargeable to several different expense items, the amount charged by the accountant is the amount shown on the time sheets that are prepared by the foremen. In their rush of duties, the foremen may neglect to make proper records at the moment, doing so instead at the end of the day. Errors so made should in the long run be largely offsetting, *i.e.*, over an extended period; overcharges and undercharges of any particular account should be about equal. The difficulty in distinguishing between maintenance and depreciation is mentioned in the chapters on depreciation. Also, the transmission of electrical energy takes place all the way from the power plants to the customers' premises; yet the system of accounts defines a portion of this transmission as distribution. In other words, transmission of electricity is accomplished by all voltages from 115 volts to several hundred thousand. In rural areas distribution is effected by 6,900-volt lines, and yet these same lines are transmission lines.

The several components of electric operation are briefly summarized as follows:

1. *Production*.—In generating energy by means of water power, the production costs are those caused by labor and maintenance of equipment. When generating by means of fuel, the costs include fuel as well as labor and maintenance.

2. *Transmission*.—Operation and maintenance of transmission lines carrying power from generating stations together with transformer substations of the generating plant are classified as transmission expense.

3. *Distribution*.—Operation and maintenance of distribution systems that carry the energy from the transmission system to the consumer are known as distribution expense.

4. *Commercial*.—This account includes bookkeeping, meter reading, uncollectible accounts, and other incidental expenses incurred in dealing with customers.

5. *Sales Expense*.—The obligation to increase its business cannot be denied a utility, for it is only by an aggressive sales policy that a utility can promote additional usage and thus be able to lower its average unit charge. Expenses incurred in the solicitation of business, advertising, demonstrations, selling appliances, and other miscellaneous expenses are charged to this account.

6. *General Expense*.—Expenses not covered by the foregoing, including taxes, legal and supervision, are included in this classification.¹

¹ For a more detailed segregation of electric-utility expenses the reader is referred to the Standard Classification of Accounts adopted by the Federal Power Commission effective Jan. 1, 1937.

SECTION IV

RETURN

CHAPTER XV

GROSS REVENUE

In General.—The gross revenue of any public utility consists of the total earnings from all sources. Some of these sources are outside the strict operation of a public utility, such as income from merchandising, income from coal mines or other enterprises not necessary for the operation of the business, income from the sale of by-products and junk, and other small items of income not strictly from the sale of the commodities for which the charter was originally granted. Some of these earnings are permitted to be credited to gross revenue and others are required to be kept in separate accounts, so that neither profits nor losses from these operations may be confused with the true income or expenses of the utility operation. This was discussed by the Utah Commission in the following:

The suggestion has been made that earnings from outside business and investments be included in revenues for rate-making purposes. Investigation of these earnings discloses that they are principally profits from sale of electrical merchandise, house wiring, earnings from an investment in a fireclay factory in Salt Lake City, and rentals from buildings in Pocatello, Idaho. In making rates we have excluded all costs, revenues, and expenses other than those actually entering into the rendering of the public service. The person who pays to have his house wired, buys an electric light globe, purchases brick in Salt Lake City, or pays rent in Idaho, cannot be required to pay part of the rate charged to the person who pays for electric power or light. Again, it sometimes happens, as we have discovered in other cases, that annual losses are realized in the conduct of other departments or investments, and we see no justice in compelling a light or power consumer who buys only a service, to assume burdens which arise from operations such as we have heretofore outlined.—*Re Telluride P. Co. (Utah)*, P.U.R. 1922B, 168, 185.

The gross revenue must be such as to pay all operating expenses incurred by the utility and a sufficient amount to give a fair return on the capital invested in the property, the risks of the business being kept in mind. The question now arises as to what is the just earning on the valuation established, both as to amount and as to items, as well as what may be included in the proper operating expenses of the company. Since only property used and useful in the public service may be included in the rate base, earnings not derived from such property and expenses not due to its operation should be ruled out of the discussion. However, it is sometimes as difficult to draw the line between utility and nonutility earnings as it is between utility and non-utility property to be included in the rate base. Among the items usually ruled out by the commissions and courts comes rental of property owned by the utility and not used in producing the service, such as office buildings, land held for future extensions but greater than that in immediate use by the utility, oil and gas wells developed for offset purposes, etc.¹

Income from Sale of By-products.—When manufactured gas is produced by the utility, there are numerous by-products, valuable for other uses, which are extracted from the gas in the process of cleaning it before introduction into the mains. These by-products, consisting of coke, ammonia, tars, etc., should either be sold by the utility or be manufactured into other more valuable products, all of which should be sold by the utility and the income from their sale credited to the gross income of the business.² In the production of natural gas in certain localities, there is a valuable by-product in the "casing-head" gasoline which may be extracted from the gas before the "dry" gas is introduced into the pipe lines for transmission to the customers. The income from this extracted gasoline should be credited to the cost of production of the natural gas in the field before determining the rate to be charged to the distributing companies and the ultimate consumers. This latter business was discussed by

¹ *Re Monbegan Water Co. (Me.)*, P.U.R. 1933B, 1; *Re Public Service Co. (Ill. 1934)*, 4 P.U.R. (N.S.) 1; *Municipal Gas Co. v. Wichita Falls (Tex. 1935)*, 9 P.U.R. (N.S.) 33.

² *Re Hughes Electric Co. (N.D.)*, P.U.R. 1925A, 18; *Re Murphy Water, Ice & Light Co. (Cal.)*, P.U.R. 1919D, 467.

the West Virginia Commission as applying to intercorporately related companies in the following:

Where in a rate case it is shown that a natural gas utility company has caused a corporation to be formed, and has transferred to it with other property, the exclusive rights to use its natural gas for the purpose of extracting gasoline therefrom, and received therefor all the capital stock of the new corporation, and is to receive a royalty of one-eighth of the gross proceeds of the gasoline as it is produced and sold, and it appears that half the net proceeds therefrom annually amount approximately to three times the eighth of the gross proceeds, such a sale, so far as the gas consuming public is concerned, is unfair; it is a sale made by the company, with the company, and for the benefit of the company, and should be ignored in determining the proportion of the income from the gasoline which should be charged to the utility. A natural gas company should not be allowed to sell its gas to its parent companies at less than its fair market value, and where it does so in a proceeding to determine gas rates for the utility, it should be treated as receiving a fair market value for the gas delivered to the parent companies.—*Charleston v. Public Service Comm.*, 95 W. Va. 91, 120 S.E. 398, P.U.R. 1924B, 601.

A similar case, with the added element of leakage caused by the extraction, was discussed by the same commission.

Income from the sale of gasoline by a natural gas company should be included in the gross income for the purpose of fixing rates when the company has expended large amounts for rerubbing its line, which rerubbing was made necessary because of the fact that the gasoline was extracted from the gas, particularly where it appears that before the line was rerubbed millions of feet of gas were lost by reason of the shrinkage of the rubber gaskets; that the gas is still escaping by reason of the fact that the gasoline has been extracted from the gas; and that the removal of the gasoline reduces the heat units in the gas.—*Re Cumberland & Allegheny Gas Co. (W. Va.)*, P.U.R. 1928B, 23.

Income from Rental of Property.—When a utility owns property used in common by several divisions, such as gas, electric, and street railway, one division may assume the value of that property in its rate base. In such case a rental should be charged to each of the other divisions for their use of the portion of the property leased to them. This rental money should be credited to the gross income of the utility receiving the same. When the company owns property not used and useful in the rendition of

service, both the value of this property and any rental from it should be eliminated from the accounts of the utility, such as capital and gross income, and none of the expenses for the upkeep of such property should be charged to the utility's operating expenses.¹

Income from Merchandising.—The primary object of a utility in selling merchandise is to get into the possession of its customers, equipment that will enable them to use more utility service. Electric and gas utilities have sales-promotion departments, whose duties are to increase the sales of utility services. By admitting for the moment the desirability of getting more customers to use more equipment, the question of the most economical method to accomplish this arises. In considering this question, one must not be unmindful of the time element, recognizing that rapid growth at certain times is highly desirable. If the profits on the sale of merchandise can be applied to reduce the expenses incurred in obtaining additional business, does it not appear to be the proper thing to do? In its standard classification of accounts, the Federal Power Commission gives the utility the choice of including the profits and losses on merchandising as "other income" in the same account or of including them in sales-promotion expense. Some states, as Wisconsin, specify that the merchandise profit and loss be included in other income.

When the profits on the appliances that are accepted by the public are sufficient to cause dealers and merchants to push their sale aggressively, there is little or no need for a utility to engage in merchandising. A great number of appliances do not fall into this category but may still be desirable load builders for the utility, in which case the utility is justified in selling them, even at a loss, the loss being determined by the amount of utility service they will use annually.

¹ Re Southern California Edison Co. (Cal.), P.U.R. 1924C, 1; Re Alexandria Water Co. (Va.), P.U.R. 1932C, 342.

CHAPTER XVI

FACTORS AFFECTING REASONABLENESS OF RETURN

In General.—Before establishing a rate of return on any public-utility property, there are many factors that must be considered. Some of these were discussed in *Smyth v. Ames*, and these elements were further emphasized in other Supreme Court cases.¹ What is a proper rate of return in one case, in one locality, or at one period of time may not be the proper amount at some future date² or in some other place. What the public requires is a solvent utility³ operating in an efficient manner,⁴ provided that the rates are not more than the service is reasonably worth. The law does not guarantee a profit from the undertaking at all times nor in all localities.⁵ Competition from other forms of service may reduce the income of a utility and make future operation at a profit impossible. The full return on the fair value of the property is predicated on efficient operation.⁴ The rate of earning of the utility is usually predicated on the earnings from similar enterprises having like risks. These elements will be discussed more in detail in later sections of this chapter.

Return to Which Utility Is Entitled.—The question of confiscation of property was formerly thought to apply to the *corpus* of the property itself. However, it has been decided that taking away the right of a utility to earn a fair and proper rate on the property value is the same as the taking away of property. The broader interpretation of confiscation has been applied

¹ Consolidated Gas Co. v. Newton, 267 Fed. 231, P.U.R. 1920F, 483; Re Hazelton Tel. Co. (Ind.), P.U.R. 1920C, 966; Re Long Island R. Co. (N.Y. Transit), P.U.R. 1928C, 748.

² Waukesha Gas & E. Co. v. Wisconsin R. Comm. 181 Wis. 281, 194 N.W. 846, P.U.R. 1923E, 634; see also 203 Fed. 864.

³ Quinn v. Harrisburg R. Co. (Pa.), P.U.R. 1920C, 106.

⁴ Re Lexington Water Co. (Va.), P.U.R. 1928E, 323.

⁵ Kings County L. Co. v. Lewis, 110 Misc. 204, 180 N.Y. Supp. 570, P.U.R. 1920D, 145; Smith v. Illinois Bell Tel. Co., 282 U. S. 133, 75 L. ed. 265, 51 Sup. Ct. 65, P.U.R. 1931A, 1.

especially to the return that a public utility may properly earn on its rate base. This interpretation does not assure to the utility that it will be able to earn a proper return on its investment under all conditions, and what may be considered as confiscation in one case will not be judged so in another which is surrounded by different conditions. On the other hand, any customer has a right to have service delivered to him by a public utility, if within its chartered territory, at a cost no greater than the value of the service to him, as determined by rates charged others in the same territory, provided that this delivery does not create unjust discrimination. Rules for extending facilities to serve tend to prevent this. If the return is placed too low by a commission, the utility has an appeal to the courts for a judicial consideration of its case. If the rates are above the value of the service, economic laws step in, tending to correct the injustice by taking away patronage (and thus return) of the utility under the higher rates.¹ The Supreme Court discussed this in several early cases, as follows:

"If the state were to seek to acquire title to these roads under its power of eminent domain, is there any doubt that constitutional provisions would require that the payment to the corporation of just compensation, that compensation being the value as it stood in the markets of the world, and not as prescribed by an act of the legislature? Is it any less a departure from the obligations of justice to seek to take not

¹Spring Valley Waterworks v. San Francisco, 124 Fed. 547; Buell v. Chicago, M. & St. P. R. Co., 1 Wis. R.C.R. 324; Public Util. Comm. v. Rhode Island Co., 43 R.I. 135, 110 Atl. 654, P.U.R. 1920F, 687; San Antonio v. San Antonio Pub. Service Co., 255 U.S. 547, 65 L. ed. 777, 41 Sup. Ct. 428, P.U.R. 1921D, 412; Indiana General Service Co. v. McCordle, 1 F. Supp. 113, P.U.R. 1932D, 378; Memphis Gas L. Co. v. Memphis, 72 Fed. 952; Rowland v. Boyle, 244 U.S. 106, 61 L. ed. 1022, 37 Sup. Ct. 577, P.U.R. 1917E, 685; Millville E. L. Co. v. Board Pub. Util. Comm., 3 N.J. Mis. R. 412, 128 Atl. 546, P.U.R. 1926A, 227; United R. & E. Co. v. West, 280 U.S. 234, P.U.R. 1930A, 225; Chicago, M. & St. P. R. Co. v. Minnesota, 134 U.S. 418, 33 L. ed. 970; Contra Costa Water Co. v. Oakland, 159 Cal. 323, 113 Pac. 668; Texas R. Comm. v. Houston & T. C. R. Co., 90 Tex. 340, 38 S.W. 750; Coal & Coke R. Co. v. Conley, 67 W. Va. 129, 67 S.E. 613; Wisconsin Pub. Service Comm. v. Wisconsin Tel. Co., 289 U.S. 67, P.U.R. 1933C, 264; Telluride Power Co. v. Utah Pub. Util. Comm., 8 F. Supp. 341 (1934), 5 P.U.R. (n.s.) 199; Re Chesapeake & Potomac Tel. Co. (Md.), P.U.R. 1916C, 925.

the title, but the use, for the public benefit at less than its market value?" *Reagan v. Farmers Loan & Trust Co.*, 154 U.S. 362, 38 L. ed. 1014, 14 Sup. Ct. 1047. "Down to the time of the adoption of the 14th Amendment, it was not supposed that statutes regulating the use, or even the price of the use, of private property, necessarily deprived an owner of his property without due process of law." *Munn v. Illinois*, 94 U.S. 113, 24 L. ed. 77. "A corporation with authority to construct and maintain a turnpike road, and to collect toll 'agreedable' to certain named rates, cannot be subsequently subjected to unjust and unreasonable tariff rates, insufficient for it to maintain its road in proper condition for public use, or to earn any dividends whatever for the stockholders." *Covington & Lexington Turnpike v. Sandford*, 164 U.S. 578, 41 L. ed. 560. "Rates fixed by ordinance producing insufficient return need not necessarily be enjoined for the future, since a rate ordinance invalid when adopted may become valid, just as an ordinance valid when adopted may become invalid by change in conditions." *Galveston E. Co. v. Galveston*, 258 U.S. 388, 66 L. ed. 678, 42 Sup. Ct. 351, P.U.R. 1922D, 159. See also *Banton v. Belt Line R. Corp.*, 268 U.S. 413, 69 L. ed. 1020, 45 Sup. Ct. 534, P.U.R. 1926A, 317; *Bluefield Waterworks & Improvement Co. v. Public Service Comm.*, 262 U.S. 679, 67 L. ed. 1176, 43 Sup. Ct. 675, P.U.R. 1923D, 11.

Attraction of Capital and Maintenance of Credit.—Public utilities must grow with the population and also with the increasing needs for the service. Electrical utilities have increased in investment at the rate of about 15 per cent per annum cumulative. This growth is nearly three times as rapid as that of the population. Even if the investors had not taken out any profits from the capital invested and had devoted the entire earnings of the utilities to making extensions, outside capital would have had to be secured to finance the extensions of the utilities. Such a policy of foregoing all earnings would be impossible of application, for the company would then have difficulty in selling new securities to make the extensions. It is, therefore, necessary that the earnings of such utilities shall be sufficient to attract capital away from other fields of investment. This state of affairs is true of all enterprises, except those financed under government ownership, where the capital may be secured from taxation. Enterprises that are unable to make payments of interest on their funded indebtedness soon find themselves in receivership. In such cases no dividends are paid on stocks of

the company until all interest on funded indebtedness is paid. In considering the earnings to which public utilities are entitled, the risks of the enterprise and current rates in the particular region in which the plants are located must be considered. These factors will be considered later.¹

Efficiency of Management and Character of Service.—Efficient management of a utility produces the service at lower operating costs than does poor management. Good service stimulates greater use by the customers. Both these elements should be considered in fixing the rate of return that should be allowed a utility. Some of the savings from efficient operation are secured by the customers in the way of lower rates for the service. However, if the rates and income are lowered as rapidly as are the expenses, the efficient service receives no reward for itself and there is no incentive for the management to make further improvements. When good service and lower rates are found together, on account of efficient management, the public is usually willing to reward the company for these qualities. Conversely, inefficiency and poor service are penalized by lower rates of return as well as by a falling off in patronage. Sometimes a service-at-cost type of contract is entered into between the utility and the community whereby the utility is automatically given a higher rate of return with a lowering of the rates for the service. To do this, a starting point must be agreed upon. For example, if the rates charged at a particular time and the rate base at the same time are used as a base from which to work, an agreement that permits a definite percentage increase in the rate of return for each 5 or 10 per cent by which the rates are lower than the base rates would be of this nature. Such an agreement must provide for an increase in such expenses as are beyond the control of the utility management. It is conceivable that an arrangement of this nature might require recognition of taxes of all kinds, wage rates, cost of living index numbers, wholesale and

¹ *Queens Borough Gas & E. Co.*, 2 P.S.C. N.Y. (1st Dist.) 544; *Havelock v. Lincoln Tel. Co.* 4 Neb. S.R.C. 91; *Re Atcheson T. & S.F.R. Co. (Mo.)*, P.U.R. 1918A, 843; *Re Southwestern Bell Tel. Co. (Okla.)*, P.U.R. 1919B, 530; *Re Pacific T. & T. Co. (Ore.)*, P.U.R. 1922C, 248; *Re Potomac E. Co. (D.C.)*, P.U.R. 1923D, 579; *Waukesha Gas & E. Co. v. Wisconsin R. Comm.*, 181 Wis. 281, 194 N.W. 846, P.U.R. 1923E, 634; *Kings County L. Co. v. Prendergast*, 7 F. (2d) 192, P.U.R. 1925C, 705; *Re Wisconsin Tel. Co. (Wis.)*, P.U.R. 1932D, 173; *Re Cities Service Co. (Kan.)*, P.U.R. 1933A, 113.

retail commodity price index figures, etc.¹ The value of efficient management and its relation to a fair return was discussed by the Supreme Court, as follows:

Before the courts are called upon to adjudge an act of the legislature fixing the minimum passenger rates for railroad companies to be unconstitutional, on the ground that its enforcement would prevent the stockholders from receiving any dividends on their investments, or the bondholders any interest on their loans, they should be fully advised as to what is done with the receipts and earnings of the company; for if so advised, it might clearly appear that a prudent and honest management would, within the rates prescribed secure to the bondholders their interest, and to the stockholders reasonable dividends. While the protection of vested rights of property is a supreme duty of the courts, it has not come to this, that the legislative power rests subservient to the discretion of any railroad corporation which may, by exorbitant and unreasonable salaries, or in some other way, transfer its earnings into what it is pleased to call "operating expenses."—*Chicago & Grand Trunk R. Co. v. Wellman*, 143 U.S. 339, 12 Sup. Ct. 400.

Interest Rates and Cost of Money.—The rate of return allowed to a utility must be somewhat greater than the prevailing rates on sound investments in the particular region and at the particular period during which the rates are to prevail. Most competitive investments are not regulated as to earnings, whereas those of public utilities are so regulated that they may not earn unreasonably large surpluses during prosperous periods, and they are not protected against losses during periods of economic depression. Unfortunately, utilities are not permitted to raise or lower rates to meet economic changes. Some workable scheme to permit this adjustment would go far in avoiding long drawn-out rate litigations. A lowering of charges during poor business periods when interest rates are low would meet with general

¹ Re Advance in Rates, Eastern Cases, 20 I.C.C. 243; Re Advance in Rates, Western Cases, 20 I.C.C. 307; *Baltz. v. Brooklyn Gas Co.*, 2 P.S.C. N.Y. (1st Dist.) 620; *Re Los Angeles Gas & E. Corp.* (Cal.), P.U.R. 1917F, 717; *Springfield v. Springfield Gas & E. Co.* (Ill.), P.U.R. 1916C, 281; *Hartford v. Connecticut Co.* (Conn.), P.U.R. 1918C, 611; *Re Red River P. Co.* (N.D.), P.U.R. 1923E, 534; *Elizabeth v. Public Util. Comm.*, 99 N.J. L. Rev. 496, 123 Atl. 358, P.U.R. 1924C, 524; *Re Bay State S. R. Co.* (Mass.), P.U.R. 1919A, 817; *Erie v. Buffalo & Lake Erie Traction Co.* (Pa.), P.U.R. 1921A, 273; *Re Badger Tel. Co.*, 3 Wis. R.C.R. 98; *Re New Jersey Central Tel. Co.*, 96 N.J. L. Rev. 90, 113 Atl. 692, P.U.R. 1927A, 495.

approval. An increase during prosperous times probably would not. And then, who is to be the judge as to when a period of prosperity ends and one of economic adversity begins? Since financing is accomplished through bond issues, usually at low rates of interest, and stock, a change in income is reflected in a change in stock dividends, and the ease of raising new money rests with the expectations of return to the investor.

Some other risks attendant on public-utility operation are not met with in general business, and these affect the necessary return that is allowed in order to encourage the utility to render efficient service at the lowest cost.¹ The interest rate is well discussed by the Iowa Supreme Court in the following:

When government bonds bearing 2 per cent annual interest are selling at a premium, and those issued by states or municipalities at little, if any, more than double such rate, are in demand, and when the current rate of interest on "gilt edge" securities on real estate or public service corporations rarely exceeds 5 per cent, it will not do for courts to say that the income, above all expenses, including taxes, on property devoted to the public service, must necessarily much exceed the last mentioned figure to avoid the charge of being confiscatory.—*Cedar Rapids Gas Light Co. v. Cedar Rapids*, 144 Iowa 426, 150 N.W. 966.

Value of Service.—The value of the service rendered has been mentioned as one of the elements to be considered in *Smyth v. Ames*, in which the court said that the railroad could not charge more than the service was worth to the public. This element is very difficult to measure with exactness, for what is valuable and necessary to one may be of little value to another. There is, of course, an economic upper limit to all charges, and rates that are above this limit will soon drive away business.² Furthermore, a customer during good times will pay for a service which

¹ Buell v. Chicago, M. & S.P.R. Co., 1 Wis. R.C.R. 324; Re Chesapeake & Potomac Tel. Co. (Md.), P.U.R. 1916C, 925; San Diego Water Co. v. San Diego, 118 Cal. 556, 38 L.R.A. 460; Re Illinois Northern Util. Co. (Ill.), P.U.R. 1920D, 979; Worcester E. L. Co. v. Attwill, 23 F. (2d) 891, P.U.R. 1929B, 5; Re Great Western P. Co. (Cal.), P.U.R. 1933C, 487; Brymer v. Butler Water Co., 179 Pa. 231, 36 Atl. 249; Murchie v. St. Croix Gas L. Co. (Me.), P.U.R. 1917B, 394; Re San Joaquin L. & P. Corp. (Cal.), P.U.R. 1920D, 940; Re La Crosse (Wis.), P.U.R. 1925A, 586; Re Cheyenne L. Fuel & P. Co. (Wyo.), P.U.R. 1930E, 114; Re Pacific Gas & E. Corp. (Cal.), P.U.R. 1934A, 1.

² Re Lehigh Valley Traction Co. (Pa.), P.U.R. 1920D, 584.

during a depression he will do without. These marginal customers do not determine the entire measure of the proper return. However, when a large portion of the business falls off because of high rates or cheaper competitive service, it is evident that the utility cannot expect so high a return as it would under conditions of almost unlimited demand. The street and interurban railways have passed through a period of high earnings when good returns were easily earned with low rates in competition with other forms of transportation. With the advent of the gasoline motorcar, bringing buses and trucks into competition with these earlier forms of transportation, business fell off; most interurban traction lines have been discontinued because they could not earn operating expenses, and street railways have been abandoned or are earning only a slight return above regular operating expenses, even with maximum allowable fares. The gas-lighting business has gone through a similar period of depression, and other uses for gas have been developed.

There is no rule at law by which the value of the service may be measured;¹ but it has been stated that the value of the service is considered to be more important than the return to the utility.² In many small towns it is impossible to levy rates that will be compensatory to the utility. About all that can be expected is to meet the proper operating expenses, including a portion of the overhead. If the value of the service is so low that the utility cannot make operating expenses or any return on its rate base, it must cut expenses or, if this cannot be done, ask permission to abandon the property.³

Ability of Consumer to Pay.—During the past several years, *i.e.*, during the extreme business depression, a new theory of charges has been promulgated and, strange to say, has had some following. This theory is that the charges for any service should be no higher than the ability of the consumer to pay. It is similar to taxing on the basis of the ability to pay. The circuit of reason-

¹ *West v. United R. & E. Co. of Baltimore (Md.)*, P.U.R. 1928D, 142.

² *Re Helena L. & R. Co. (Mont.)*, P.U.R. 1920D, 668; *Re Pocatello Gas & P. Co. (Idaho)*, P.U.R. 1923C, 25; *Re Alabama Util. Co. (Ala.)*, P.U.R. 1932A, 435; *Gay v. Damarascotta-Newcastle Water Co.*, 131 Me. 204, 162 Atl. 264, P.U.R. 1932E, 289.

³ *Re Puget Sound P. & L. Co.*, 179 Wash. 461, 38 P. (2d) 350 (1935), 7 P.U.R. (N.S.) 14.

ing leading up to this conclusion is as follows: A utility has its investment made; it has certain operating expenses regardless of the number of customers served; a decrease in the number of patrons will not decrease the investment already made or the operating expense, except to a very limited extent; so a decrease in the charges made to such customers as would otherwise discontinue will not be so bad as the complete loss of the business secured from them. Therefore, it is better to keep the customers who would otherwise discontinue, even if they pay only a portion of the regular tariffs. In some classes of business, this condition is met by selling goods of a different quality, by charging less for travel in ordinary coaches than in Pullman cars, etc., but with electric, gas, and water utilities this solution is impossible. Second-quality street lighting may be accomplished by reducing the size of individual lamps, number of lamps, or hours of lighting; yet the fixed charge on the equipment devoted to this purpose will remain the same. The lowering of charges during economic depressions might be very desirable if complete assurance were given that the low charges would be in effect for a definite temporary period only and that regular charges would prevail after a stipulated date. When the plea was made by a city against rates charged for service to the municipality, it was pointed out by the city that all available funds were appropriated for other purposes and that the city was at its limit as to taxation. Such pleas were not allowed except for temporary periods, and the city was compelled to curtail its requirements rather than to have its rates lowered.¹

Necessity of Valuation.—In making a determination of rates for a public utility, it is necessary to establish a rate base by some method of valuation. This determination consumes considerable time, particularly for large and involved enterprises, and the plea is sometimes used that the award should be made without a new valuation.² In some cases the public utility is permitted to

¹ *Spokane v. Kuykendall*, 119 Wash. 107, 205 Pac. 3, P.U.R. 1920D, 467; *Bronkman v. Lincoln T. & T. Co.* (Neb.), P.U.R. 1931E, 454; *Re Mount Pleasant Water & L. Co.* (W. Va.), P.U.R. 1920F, 198.

² *Spurr on Guiding Principles in Rate Regulation*, Vol. II, p. 161; *Re Freeport Gas Co.* (Ill.), P.U.R. 1920B, 726; *Re Mission Range Power Co.* (Mont.), P.U.R. 1920C, 56; *Ohio & Colorado Smelting & Refining Co. v. Public Util. Comm.* 68 Colo. 137, 187 Pac. 1082, P.U.R. 1920D, 197; *Re*

collect the rates that are in question, laying aside a portion of the income into a fund, specified by the commission, which will later be used to refund to the rate payers the amount by which charges made under the old rates exceed those made under the new rates. In other cases commissions have attempted to arrive at a valuation by some method that will consume less time for its determination. The split-inventory method was one of these devices for saving time and cost, but it was declared to be illegal in several cases where it was applied, as explained in the section on valuation. Where the amount asked for by the utility is no more than will provide sufficient income to meet operating expenses, and perhaps the interest on the bonded debt, the valuation is often omitted by agreement.¹ In such instances temporary rates may be placed in effect until a later date when conditions are different or better information is available. At such time as the utility is able to earn more than enough to take care of operating expenses, including taxes, depreciation, and a small earning to be applied to net return, the commission can again review the case and make a determination of rates on the basis of a fair rate base.²

Risk of the Enterprise.—The interest rate required on money invested in any enterprise bears a direct relation to what is called the "risk of the enterprise." A few investments, like government, state, and municipal bonds, have the lowest risk and bear the lowest rate. They are used for investments where safety is the principal factor and the earnings are not the prime motive of the investor. Public-utility investments have much higher risks and bear much higher rates of interest in order to attract the necessary capital into these enterprises. Among these risks are competition with other forms of supply such as establishment of a municipally owned plant competing with a privately owned utility; competition with other sources of supply such as competition of one form of illuminant with another or of different forms of transportation with each other; changes in laws or city

Clarksburg L. & H. Co. (W. Va.), P.U.R. 1928B, 290; Washington R. & E. Co. v. Public Util. Comm. (D.C.), P.U.R. 1930D, 154; for commission decision see *Re Capital Traction Co.* (D.C.), P.U.R. 1930D, 25.

¹ *Re Inter-county Tel. Co.* (Mo.) P.U.R. 1931B, 5.

² *Rockland L. & P. Co. v. Maltbie*, 241 App. Div. 122, 271 N.Y. Supp. 858 (1934), 4 P.U.R. (N.S.), 113.

ordinances requiring changes in construction and increase in investment without any increase in earning power at the former rates; failure of a city to grow in the direction originally planned, investments in some regions thus earning no return or only a slight one; actual decrease in the growth of a city or community on account of changes in economic or other factors; changes in the technique which make equipment obsolete or inadequate before the depreciation reserve has been built up to care for functional depreciation; the tendency of recent legislation to restrict many kinds of public utilities; the fact that capital may not be withdrawn from such investments and reinvested in other fields as it may be in other forms of business; and other special forms of restrictions. A public utility is one form of business which, because it is a monopoly engaged in a public enterprise, is subject to regulation by many different governmental bodies. Sometimes these forms of regulation are helpful, and at other times they hamper the growth of a utility or make it necessary for a utility to operate at a loss until the rates can be changed to make possible a proper income. No form of insurance is available to take away these risks from public-utility investments. For this reason, regulatory bodies should be willing to grant a rate of return commensurate with these special risks. Not all utilities have the same risks, and these risks are not so great in an old, well-established utility in a progressive, fast-growing community as in a new enterprise in a more competitive field.

Beginning with the most secure type of investment, *viz.*, government securities, which in long-term debt averages less than 3 per cent per annum, one might argue that the percentage above this is the additional risk factor. That is, an investor purchasing utility securities averaging 6 per cent could set aside the difference between his and government interest rates, or slightly more than 3 per cent, and let it accumulate at the same interest rate. After a time, the amount thus set aside would become a sort of insurance fund which could be used to make up all or a portion of the loss in the value of the securities purchased, regardless of the cause of the shrinkage in value. This procedure, in principle, is already being practiced because financing of utilities is accomplished by two or more classes of indebtedness, as, for example, bonds, preferred stock, and common stock. The bonds, having

the first lien on the property, command the lowest rate, the actual rate depending also on the ratio of the amount of bonds outstanding to the total of all obligations. If the amount of bonds outstanding is 50 per cent, the interest rate would be less than if the amount outstanding were 75 per cent. The ease of selling bonds and other certificates of indebtedness and their market value are the result of the opinions of the great body of investors, and, after all is said and done, the ability of a utility to finance its capital requirements at a reasonable rate depends upon these opinions. For this reason, the rate of return allowed is a matter of judgment to be made after review of all relevant facts in the light of past experience and future predictions.¹

Past Earnings and Deficits.

The fact that a public utility company has earned large dividends in the past does not in any way affect the method of arriving at a reasonable return. The power of the Commission to make temporary rates is limited by statutory provisions and such rates should be made with due regard to a reasonable, average return upon capital actually expended and to the necessity of making reservations out of income for surplus and contingencies. The court cites the Supreme Court of the United States in *Public Utility Comm'rs v. New York Tel. Co.* 271 U.S. 23, P.U.R. 1926C, 740, in which it was held that profits of the past cannot be used to sustain confiscatory rates in the future.—*New York Edison Co. v. Maltbie* (N.Y. 1934), 1 P.U.R. (N.S.) 481.

However, in general, the past history of a utility is taken into account in the consideration of rates for the future. Money

¹ *Hill v. Antigo Water Co.*, 3 Wis. R.C.R. 623; *Willcox v. Consolidated Gas Co.*, 212 U.S. 19, 53 L. ed. 382, 48 L.R.A. (N.S.) 1134, 20 Sup. Ct. 192; *Public Util. Comm. v. New York Tel. Co.*, 271 U.S. 23, P.U.R. 1926C, 740; *New York Edison Co. v. Maltbie* (N.Y. 1934), 1 P.U.R. (N.S.) 481; *State Journal Printing Co. v. Madison Gas & E. Co.*, 4 Wis. R.C.R. 501; *State ex rel. Hopkins v. Southwestern Bell Tel. Co.*, 115 Kan. 236, 223 Pac. 771, P.U.R. 1924D, 388; *Missouri K. & T. R. Co. v. Love*, 177 Fed. 493; *Re Pacific T. & T. Co. (Ore.)*, P.U.R. 1924D, 39; *Re Republic L. H. & P. Co. (N.Y. 2d Dist.)*, P.U.R. 1921C, 795; *Tennessee Eastern E. Co. v. Public Util. Comm. (Tenn.)*, P.U.R. 1928D, 722; *State ex rel. Springfield v. Springfield Gas & E. Co.* 291 Ill. 209, 125 N.E. 891, P.U.R. 1920C, 640; *Re West Virginia Central Gas Co. (W. Va.)*, P.U.R. 1920C, 546; *Re Laclede Gas L. Co. (Mo.)*, P.U.R. 1929A, 36; *Pacific Gas & E. Co. (Cal. 1934)*, 1 P.U.R. (N.S.) 1.

diverted from maintenance to dividends or for other purposes¹ must be taken into account in considering future rates; but future rates cannot be made to compensate for past deficits, particularly when the operation of the utility has been inefficient.² A company that has barely made operating expenses and a small net return with efficient operation should be given more liberal treatment in the future than one that has been able to pay excessive dividends or to lay aside a large surplus out of its earnings.³ "The public is not entitled to the use of a toll bridge for a nominal sum merely because it is a public highway, and because the returns in the past have been sufficient to defray expenses and repay the original investment." *Havre de Grace & P. Bridge Co. v. Towers*, 132 Md. 16, 103 Atl. 319, P.U.R. 1918D, 484.

Past Financial History.—The past financial history of a public utility is another matter to be considered in making an allowance for return. The public can always learn from the returns and reports of a utility what has been paid for interest and dividends. Although this value does not bear any real relation to the return on the rate base, it has its influence on the opinion of the public. In states in which the utility commission has control of the issue of securities and the price to be charged for them, the earnings on these securities have a more direct bearing on the proper return than in states in which there is no such control.⁴

Utility in Developmental Stage.—A newly installed utility in a developmental stage cannot expect a full return during the first years of operation. If rates are fixed such as would make

¹ Re Ithaca Transit Co. (N.Y. 2d Dist.), P.U.R. 1919B, 616; Re Linding Fuel & Gas Co. (Mich.), P.U.R. 1921C, 465; *Danbury v. Danbury Gas & E. Co.* (Conn.), P.U.R. 1921D, 193.

² Re West Ohio Gas Co. (Ohio), P.U.R. 1928C, 25; Re Cayuga Omnibus Corp. (N.Y.), P.U.R. 1931C, 238; Re Laclede Gas L. Co. (Mo.), P.U.R. 1919A, 36; Re Kankakee Water Co. (Ill.), P.U.R. 1929D, 360.

³ Re New Hartford Water Co. (Mo.), P.U.R. 1930C, 22; Re Clinton E. L. & P. Co. (Conn.), P.U.R. 1931E, 196; Re Detroit Edison Co. (Mich.), P.U.R. 1933E, 194; *Yonkers R. Co. v. Maltbie* (N.Y. 1937), 19 P.U.R. (n.s.) 307.

⁴ Re Black River Tel. Co. (N.Y. 2d Dist.), P.U.R. 1931C, 26; *Danbury v. Danbury & B. Gas & E. Co.* (Conn.), P.U.R. 1921D, 193; Re Ithaca Transit Co. (N.Y. 2d Dist.), P.U.R. 1919B, 616; *Coal & Coke R. Co. v. Conley*, 67 W. Va. 129, 67 S.E. 613; *San Diego Water Co. v. San Diego*, 118 Cal. 556, 38 L.R.A. 460; Re Central Arizona L. & P. Co. (Ariz.), P.U.R. 1921D, 163; *R. R. Comm'rs v. Mutual Oil Co.* (Mont.), P.U.R. 1923C, 640.

the utility a paying venture from the start, as if the customers were taking their full quotas of service, the utility will be unable to attract new business. A lower rate and a small return at the beginning are necessary to build up the business rapidly. After the business has been established under these rates, the income will probably be sufficient to pay a fair return. An adjustment may have to be made at that time among the different groups of rates, either to attract new lines of business or to relieve unfair division of the costs of operation among these groups.¹ Another phase of the question is covered in the following citation:

A public utility is entitled to a rate which will produce a fair return on the present fair value of its property used in public service; and a Commission cannot, in anticipation of future expansion, fix a rate presently unfair but which will become reasonable under such future conditions, nor can it refuse to fix a rate presently fair because it might become subsequently excessive.—*Great Falls Gas Co. v. Public Service Comm. of Montana*, 34 F. (2d) 297, P.U.R. 1929E, 628.

Overbuilt Utility.—Sometimes a utility is built for supplying a larger territory or a larger load than later develops. At other times, a utility loses part of its business through competition or other causes, such as new inventions or changes in public requirements. Such a utility cannot expect the remaining customers to pay a full return on an overbuilt utility plant. All that can be expected is a sufficient return to pay operating expenses, return on the portion of the plant necessary to render the service, and perhaps to create a depreciation reserve to write off the excess investment.²

Trend in Prices.—Formerly, trends in prices were not considered in valuation, for it was the custom to base decisions and predictions on averages over a short period previous to the time of the decision. Since about 1920, there has been a change in the decisions in this particular so that price trends are now considered in all three of these fields of application (rate base, expenses, and return) to the rate structure. However, in considering a probable drop in cost of materials, a probable upward trend in labor costs

¹ *Re Puente City Water Co. (Cal.)*, P.U.R. 1921C, 451; *Re Northern Nebraska P. Co. (Neb.)*, P.U.R. 1926D, 371; *Re Kellogg (Cal.)*, P.U.R. 1922E, 659; *Re Telluride P. Co. (Utah)*, P.U.R. 1922B, 168.

² *Pfaff v. Adirondack L. & P. Co. (N.Y.)*, P.U.R. 1922D, 655; *Re New Jersey Suburban Water Co. (N.J.)*, P.U.R. 1931B, 438.

should be considered as an offset.¹ A drop due to an economic depression may cause a falling off in the use of the product as well as in the unit prices for the labor and material. The utility must also be satisfied with a much lower return during an emergency, for a great portion of its customers are not able to pay for the amount of service to the extent previously used. In order to retain the majority of these customers, it is usually necessary to make some sort of temporary price reduction.²

Favorable Location.—Favorable location was brought forward under valuation as a reason for a higher rate base for a utility; it is now introduced as a possible reason for a higher return. Favorable location and cheap natural resources, such as hydroelectric power or natural gas, permit the utility to furnish the service at a lower rate than where the cost of production is higher. The full benefit of this cheap production cannot be claimed by the utility, either by fixing a higher valuation or rate base or by charging a higher return than justified by the cost of the service. Neither does unfavorable location, caused by the retrogression of a community, permit the utility to earn a full return on the full value of its property, for this is one of the risks taken in entering the business.³

Treatment of Taxes.—The decision of the United States Supreme Court in the Galveston Electric Case allows a utility to charge all forms of taxes to operating expenses. However, it was also stated in connection with the Federal income tax that this charge would need to be taken into consideration in connection with the return allowed the utility, for the stockholders were permitted to deduct the dividends on such stocks from their total incomes before computing their Federal income taxes. This decision has been considered by the various commissions and

¹ Re Central Illinois Util. Co. (Ill.), P.U.R. 1921C, 331; Re Birmingham Gas Co. (Ala.), P.U.R. 1932B, 241.

² Re Wisconsin Tel. Co. (Wis.), P.U.R. 1932D, 173; Re Kentucky-Tennessee L. & P. Co. (Tenn.), P.U.R. 1932E, 387; Re Lone Star Gas Co. (Okla.), P.U.R. 1933C, 1; Saugus v. Lynn Gas & E. Co. (Mass. 1934), 2 P.U.R. (n.s.) 433.

³ State ex rel. Springfield v. Springfield Gas & E. Co., 291 Ill. 209, 125 N.E. 891, P.U.R. 1920C, 640; San Antonio Pub. Service Co. v. San Antonio (Tex.), P.U.R. 1924A, 259; Re Stella Tel. Co. (Neb.), P.U.R. 1921C, 781; Re Leadville Water Co. (Colo.), P.U.R. 1931E, 26; Re Escanaba P. & Traction Co. (Mich.), P.U.R. 1931D, 152.

courts, and different methods of accounting for the income tax have been devised.¹ The California Commission discussed this as follows:

An income tax has been imposed by the Federal Government since this Commission first acquired jurisdiction over power utilities and established what it considered a fair rate of return. This tax is now 12.5 per cent of net revenue after bond interest, depreciation and certain other smaller deductions, which, in this case, is equivalent to approximately 14 per cent on the reasonable rate base found herein. If this tax were allowed as part of the return of the company, a return of 8.4 per cent at the present time would be approximately equivalent to the 8 per cent allowed in 1913.—*Re Pacific Gas & E. Co. (Cal.)*, P.U.R. 1923C, 385.

A case before the Wisconsin Commission discusses the difference between a company financed entirely by stocks and one partly financed by bonds:

It appears to us that this ruling requires the fixing of a lower rate of return for a company financed entirely through capital stock and surplus, as in the case of the Barron County Telephone Company, with a higher proportion of debt, and as a result, lower income taxes. If income taxes are to be taken into consideration in determining what rate of return should be deemed fair, as the court has ruled, the conclusion seems to be inescapable that the relative amount of such taxes should have an effect on the rate of return allowed. The capital structure of a company has a marked effect on the amount of income taxes paid, and hence should be considered in determining a reasonable fair return.—*Re Barron County Tel. Co. (Wis.)*, P.U.R. 1933E, 403.

Public Policy.—Public policy should be considered in fixing the rate of return. Instead of limiting the utility to just enough to escape the claim of confiscation, a more liberal policy should be assumed by the public toward the utilities.² A utility which is starved for earnings and toward which the public does not have the good will to assist in increasing its business cannot maintain its plant in the proper condition to deliver the service that the public should require and expect.³ The utility should be able to sell its securities at the lowest rates and to finance all new exten-

¹ *Petersburg Gas Co. v. Petersburg*, 132 Va. 82, 110 S.E. 533, P.U.R. 1922C, 172; *Re Detroit Edison Co. (Mich. 1937)*, 16 P.U.R. (N.S.) 9.

² *Re United Fuel Gas Co. (W. Va.)*, P.U.R. 1918C, 193.

³ *Re Georgia R. & P. Co. (Ga.)*, P.U.R. 1918F, 624.

sions and betterments as rapidly as they are needed, so that it can reduce its expenses, give lower rates to the public, and deliver a better quality of service. In this manner, the utility may be able to assist the community in building up its industries and, incidentally, its population.¹

Necessity for a Surplus.—Every well-regulated business should set aside a reasonable surplus on which to draw at times when necessity arises. Such a surplus may be set up to provide for a lack of earnings during periods of economic depressions or when emergencies occur. A falling off in the supply of water for the operation of hydroelectric or irrigation projects; the lack of business of a gas company, selling largely for heating, due to a period of warm weather causing a small demand; and other similar emergencies in other public-utility operation will bring in less than the usual amount of return. In other words, the return may be more than sufficient to pay operating expenses and interest and dividends on the securities, and part or all of this extra income may be put into the surplus fund to be drawn on in the years of smaller income. If the accounting period were 7 or 10 years, instead of 1, this very thing would be accomplished. Since the business cycle appears to be about 7 years, interest rates could be stated as 42 per cent per cycle (instead of 6 per cent annually) payable at the rate of 6 per cent annually, 3 per cent semi-annually, or 1.5 per cent quarterly. The earnings of the utility should be sufficient to provide this income and to keep it at the proper amount to serve as a balance.² This was discussed by the United States Supreme Court in *Shepard v. Northern Pacific Railroad Co.* in 1912, as follows:

An investment in a bank, factory, a mercantile, a manufacturing, or an agricultural business, is substantially free from regulation by the government, and exempt from any duty to the public except that of paying taxes. If the business in which such an investment is made is unprofitable, its owners may promptly discontinue its operation until more prosperous days come and then return to their undertaking. An investment in a railroad which operates in many states is subject to the regulation of its business by many governments. Its owners owe the duty to the governments and to the public to operate their railroad continually, in days when its operation is unprofitable as well as when

¹ *Re Chesapeake & Potomac Tel. Co. (Md.)*, P.U.R. 1916C, 925.

² *Re Lockport L. H. & P. Co. (N.Y. 2d Dist.)*, P.U.R. 1918C, 675; *Peekskill v. Peekskill L. & R. Co. (N.Y.)*, P.U.R. 1923C, 169.

it is remunerative, a duty they must discharge under penalty of the forfeiture of their property if they fail. In view of these facts they ought to accumulate in prosperous days a surplus large enough to enable them to protect their property in days of disaster, and to make their average return through days of prosperity and adversity fair and just.—*Shepard v. Northern Pacific R. Co.*, 184 Fed. 765; reversed on other grounds in 230 U.S. 352, 57 L. ed. 1511, 33 Sup. Ct. 729.

Effect of Competition.—Lines of business that are not monopolistic are subject to direct competition with others engaged in the same line and in the same region. This competition tends to lower prices and to produce better service in such mercantile enterprises. In the public-utility field, on the other hand, competition causes a divided field and a greater investment cost, as well as a greater operating cost per customer. On this account, it is unusual to find public utilities of the same kind competing with each other in the same territory. Instead, they become monopolies where prices are not controlled by competition; therefore, some form of regulation has been resorted to in most states for fixing proper rates and rules for service. However, occasionally competition develops owing to the installation of a governmentally owned plant or to some other privately owned utility entering the same field. Because only a moderate portion of the revenue secured is used for operating expenses, the remainder paying fixed charges, the temptation to retain existing business and to secure new by cutting prices is very great. This practice if pursued finally results in a lack of proper return for both utilities. In the case of lowering the return, one or both of the utilities will face bankruptcy, and the field will ultimately be served by one enterprise.

Competition of interurban railways with steam railroads, and of automobiles with both of these utilities, has caused many business failures in the railway field. Competition of electric lighting with gas lighting has driven the gas industry into other lines of service, such as heating and cooking. These forms of competition have a marked effect on each of the competing enterprises and, when no new business of a different nature can be secured, result finally in receivership and bankruptcy.¹

¹ Re United R. & E. Co. (Md.), P.U.R. 1928C, 605; Re Edison E. Ill. Co. (Mass. 1934), 5 P.U.R. (N.S.) 359; *West v. United R. & E. Co. of Baltimore* (Md.), P.U.R. 1928D, 142.

Other Factors.—Many other factors contribute to the amount of return or the rate of return to be allowed a public utility.¹ Among these are the fact that consumers have contributed some amounts to the construction of extensions into sparsely settled districts; the size of the utility and the size of the community served by the utility; wage increases; reductions in hours of labor and other working conditions demanded by workmen under union affiliation; the fact that bond discount and cost of financing are not considered either in the rate base or in the operating expenses of the utility; and the fact that the value of the utility is placed sometimes at a greater amount than the actual investment.² The use of the reserves in the business without payment of interest for this money is permitted in some states. This gives a rate base greater than the investment unless the amount of these reserves is deducted from the reproduction cost.³ Payments to holding companies for financing and management fees, when no real service is rendered by these companies to the subsidiaries, cause an increase in the operating expenses and an equivalent required increase in the earnings.⁴ Free municipal service by a publicly owned plant and diversion of funds to nonutility uses cause greater earnings to be required and thus result in higher rates for other service.

Test Period for Determining Rates.—When a new rate schedule is determined by a commission and the order is entered for the utility to try the new rate structure, there is always a certain period of uncertainty, or trial period, during which the utility must find out whether the new structure will bring in a sufficient return. An increase in rates will drive certain business into other competitive fields, and this loss in business may more than offset the increase in the rate. On the other hand, a new promotional or an objective rate schedule may build up sufficient new business to bring in a greater total net return than existed under the previous rates. In the power field, a lower rate for electrical

¹ *Baird v. Burleson* (N.Y. 2d Dist.), P.U.R. 1920D, 529; *Re Central Arizona L. & P. Co.* (Ariz.), P.U.R. 1921D, 163.

² *Re Indiana Bell Tel. Co.* (Ind.), P.U.R. 1922C, 348.

³ *Spurr on Guiding Principles of Rate Regulation*, Vol. III, p. 144; *Re Coos Tel. Co.* (N.H.), P.U.R. 1918F, 592.

⁴ *Gilchrist v. Interborough Rapid Transit Co.* (N.Y.), P.U.R. 1929B, 435; *Re Alexandria Water Co.* (Va.), P.U.R. 1932C, 341; *Re Great Western P. Co.* (Cal.), P.U.R. 1933C, 487.

energy may attract business from new customers who are now generating their own energy. The trial period for new rates or new rate structures is 3 to 5 years, after which time the utility may again petition the commission for relief if the rates are insufficient to give the expected return.¹

¹ Consolidated Gas Co. v. Newton, 267 Fed. 231, P.U.R. 1920F, 483; Brooklyn Union Gas Co. v. Prendergast, 7 F. (2d) 628, P.U.R. 1926A, 412.

CHAPTER XVII

REASONABLENESS OF THE RETURN AS A WHOLE

General Rule.—Spurr has stated:

Viewed as a rate-payer's question of discrimination, it is very true, that if a company is earning a reasonable return for the whole body of its rates, it has no ground for claiming that its property is being confiscated; but if it were shown that rates for certain parts of the service were not producing a reasonable return on the property devoted to it, other rate payers might reasonably object that they were paying more than their fair share of the return; that losses from one branch of the service, for example, were being recouped at their expense. The question of reasonableness of the return as a whole is, therefore, not solely a company question.—Spurr on Guiding Principles of Rate Regulation, Vol. III, p. 194.

The United States Supreme Court has considered the question of intrastate vs. interstate rates of railroads in several important decisions, among which the following are cited:

"The state cannot justify an unreasonably low rate for domestic transportation, considered alone, upon the ground that the carrier is earning large profits on its interstate business, over which so far as rates are concerned, the state has no control. Nor can the carrier justify unreasonably high rates on domestic business on the ground that it will be only in that way able to meet losses on its interstate business. So far as rates for transportation are concerned, domestic business should not be made to bear the losses of interstate business, nor the latter the losses of the domestic business." *Smyth v. Ames*, 169 U.S. 466, 18 Sup. Ct. 418. "The Supreme Court, in considering the validity of maximum interstate rates, fixed by North Dakota for the transportation of coal in carload lots, held that a state cannot compel a carrier to establish a rate upon a particular commodity which is less than reasonable, in order to build up a local enterprise." *Northern Pacific R. Co. v. State ex rel. McCue*, 236 U.S. 585, 35 Sup. Ct. 429, P.U.R. 1915C, 277. "Unprofitable lines of a railroad within a state should not be excluded, in determining whether a statutory rate confiscates its property, in the absence of illegality and mismanagement

in the acquisition of such lines." *Groesbeck v. Duluth, S. S. & A. R. Co.*, 250 U.S. 607, 63 L. ed. 1167, 40 Sup. Ct. 38, P.U.R. 1920A, 177. "A carrier is entitled to fair remuneration on all its investments and property. It is entitled to no more. For this it undertakes to reasonably serve in the capacity chosen by it. It undertakes to serve no less. If the carrier receives in the aggregate such fair remuneration, notwithstanding the rates on part of its business are not remunerative, the carrier has no basis for complaint. When a rate on a part of the business is too low some other part of the carrier's business may be paying too much, thus preventing a deficiency of income which would otherwise result from the non-remunerative rates. In such cases the shippers affected by the higher rates may have a basis of complaint. If on such shippers' complaint the rates are reduced, and thus the carrier's net return caused to be non-remunerative, the carrier may then be entitled to complaint and show the facts." *Vandalia R. Co. v. Schnull*, 188 Ind. 87, 122 N.E. 225, P.U.R. 1919C, 637. On appeal, the Supreme Court held that, "The test of their legality, and any deficiency in them cannot be made up by rates on other traffic." *Vandalia R. Co. v. Schnull*, 255 U.S. 113, 65 L. ed. 539, 41 Sup. Ct. 324, P.U.R. 1921C, 507.

On the basis of these and other decisions bearing on the same question, the lower courts and the commissions have ruled that, in general, each branch of a combined utility must be self-supporting. This ruling has been applied especially to utilities operating several branches in the same city or territory, such as electric, gas, or street railway. Under this ruling, it has been stated that the income from the electric and gas business cannot be used to furnish funds to operate a street railway and that larger communities on a statewide system of electrical or telephone transmission cannot be made to support the operations in the smaller communities unless there can be shown a direct community of interests.

As stated elsewhere, the cost of rendering service to any particular class of business served by the same utility cannot be determined with exactness because of the necessity of allocating certain expenses common to more than one class of business. Usually, the additional cost of serving a particular class or group can be determined with fair accuracy; and if the revenue secured from the particular group is greater than the additional expense incurred, this difference can be applied to absorb part of the overhead, the other customers thus being relieved of this amount. However, uniform rates were fixed in some cases for an entire

water system supplying several communities close together of about the same size and having a similar character of business.¹

The Commission must deal with the electric and gas departments separately and while a return of 7.5 per cent might be established at this time for the electric department as one which would clearly avoid confiscation it appears that a higher rate of return should be allowed in view of certain economies which come from the joint operation of the two departments and in this case the Commission established 8 per cent as a fair return upon the fair value of the electric department.—*Torrington v. Torrington E. L. Co.* (Conn. 1936), 13 P.U.R. (N.S.) 24.

The Alabama Supreme Court overruled a contention that high rates would confiscate the subscriber's property and interfere with his liberty, in the following:

The argument is ingenious, but not sufficiently persuasive. If such a theory is accepted, then all rate-making legislation is reviewable and reversible by the courts, for to determine the matter as to the subscriber a full consideration of all facts and circumstances in every instance would be necessary. A rate fixed by the legislature would be as much the subject of attack by the subscriber as one fixed by the Commission. Ours is a representative government, and the legislature represents the people of the state who are subscribers to a telephone service. It would follow, as a logical result of the theory advanced by the city, that a subscriber who has no invested capital at stake, but only a desire for a lower rate, and dissatisfied with the schedule fixed in the law passed by his representatives in the legislature, could appeal to the courts to have the law nullified, and a new schedule of rates established by the judicial branch of our government, and thus have the court's judgment in a purely legislative matter substituted for that of the law-making body.—*Birmingham v. Southern Bell T. & T. Co.*, 176 So. 301 (1937), 21 P.U.R. (N.S.) 36.

Return during Abnormal Periods.—There are numerous emergency periods in the operation of any business when the income is less than that during other periods. These periods of depression

¹ Re Desert P. Co. (Utah), P.U.R. 1922E, 661; Wood v. Elmira Water L. & R. Co. (N.Y. 2d Dist.), P.U.R. 1927B, 400; Re Central Georgia R. Co., 209 Fed. 75; Re Georgia P. Co. (Ga.), P.U.R. 1928A, 830; Bridgeport v. Connecticut Co. (Conn.), P.U.R. 1922A, 95; Trenton v. Trenton & Montgomery County Traction Co., 92 N.J. L. Rev. 61, 105 Atl. 136, P.U.R. 1919B, 873; Re Wabash Valley E. Co., 1 F. (2d) 106, P.U.R. 1932B, 225; Re Monticello Steamship Co. (Cal.), P.U.R. 1920C, 550; Re Commonwealth Water Co. (N.J.), P.U.R. 1922C, 48.

are more or less temporary. A nonregulated business is able to lay aside a fund from extra earnings during periods of good times to help tide it over these depressions. However, a regulated business, such as a public utility, is controlled in its earnings during good times and may not be able to set aside as large an amount to surplus as the management feels should be.

Among the causes held to produce emergencies requiring temporary relief, without the usual formalities, are increased salaries recommended by the commission, increases in wages due to economic conditions, necessity of maintaining high operating efficiency during a National emergency, such as war, in face of abnormally high operating costs; operating at a loss, notwithstanding that franchise rates during the early years of the utility's operation yielded an excessive return, unless it can be shown that during such period funds were distributed in dividends that should have been devoted to making accruing depreciation good; insufficiency of revenue for the previous year to cover maintenance and operation, exclusive of taxes and a return on the property; threatened insolvency; insufficient revenues to meet fixed charges; inability to pay the interest on bonds and the dividends on stock and make necessary retirements thereof; the necessity of meeting large capital obligations, including the retiral of notes and necessary construction; inability to pay operating expenses and adequately to maintain service; and inadequacy of return.—Spurr on Guiding Principles of Rate Regulation, Vol. III, p. 154.

If emergency relief is to be granted, there must be a real emergency and the utility must be practicing economy in the highest degree. Sometimes these emergencies are brought about by the commission itself, by the installation of temporary rates that do not bring in sufficient return on the rate base, as finally determined by the commission. In such cases a larger return should be allowed for a period (if within the law) to reimburse the utility for its losses under these temporary rates.¹

¹ Re Manitowoc Gas Co. (Wis.), P.U.R. 1918A, 710; Re Indianapolis Water Co. (Ind.), P.U.R. 1919A, 448; Re San Diego Gas & E. Corp. (Cal.), P.U.R. 1919C, 870; Nashville R. & L. Co. (Tenn.), P.U.R. 1920C, 1; Re Tri-State T. & T. Co. (Minn.), P.U.R. 1919C, 5; Public Service Comm. v. Spokane Falls Gas L. Co. (Wash.), P.U.R. 1921C, 519; Re New York State R. Co. (N.Y.), P.U.R. 1922B, 75; Re Indiana Bell Tel. Co. (Ind.), P.U.R. 1922C, 348; Great Falls Gas Co. v. Public Service Comm. (Mont.), P.U.R. 1929E, 628; Re West Coast Tel. Co. (Wash.), P.U.R. 1933A, 487; New York

Frick, Chief Justice of the Utah Supreme Court, said:

While, generally speaking, every utility that serves the public must be allowed a fair return on its investments over and above the actual cost and expenses of providing adequate, efficient, and safe service when economically managed, yet it is not true that such return must be assured to every utility when, as now, the conditions are grossly abnormal on account of the war time and under such conditions every individual and every enterprise must bear his or its share of the burden incident to the great conflict; and while rates should be adequate to permit every public utility to pay a reasonable wage to its employees and to provide adequate, safe, and efficient service, yet rates should not be so high as to become oppressive, and they should be so regulated as to be fair both to the utility and to the public.—*Salt Lake City v. Utah L. & Transit Co.*, 52 Utah 210, 173 Pac. 556, P.U.R. 1918F, 377.

The Maryland Commission discussed the subject of temporary rates in the Consolidated Gas, Electric Light and Power Company Case in the following:

If the business of the Consolidated Gas, Electric Light and Power Company should be conducted like that of any ordinary industrial concern by closing down a part or all of the plant during times of depression and cease to make any extensions to take care of new customers, or, if during boom times such as we have just passed through the company could increase its rates and earn a large surplus to carry them through periods of depression, there would be no necessity for any considerable increase at the present time. However, it must continue to extend both the gas and the electric services and it must secure the money for making these extensions amounting to millions of dollars each year. This money cannot be raised through taxes nor can it be commandeered, but it must be voluntarily contributed as an investment by people who have

Edison Co. v. Maltbie, 150 Misc. 200, 270 N.Y. Supp. 409 (1934), 1 P.U.R. (n.s.) 481; *Re Southern Bell Tel. Co.* (N.C. 1935), 7 P.U.R. (n.s.) 21; *Mattoon v. Coles County T. & T. Co.* (Ill.), P.U.R. 1915C, 660; *Anderson v. Pierce County Tel. Co.* (Wis.), P.U.R. 1915D, 330; *Re Oklahoma Gas & E. Co.* (Okla.), P.U.R. 1919B, 543; *Re Peoples P. Co.* (Ill.), P.U.R. 1920 E, 710; *Re Moundsville Water Co.* (W. Va.), P.U.R. 1922B, 28; *State ex rel. Southwestern Bell Tel. Co. v. Missouri Pub. Service Comm.* 262 U.S. 276, P.U.R. 1923C, 193; *Columbus Gas L. Co. v. Public Service Comm.*, 193 Ind. 399, 140 N.E. 538, P.U.R. 1923E, 602; *Ottinger v. Consolidated Gas Co.* (N.Y.), P.U.R. 1927A, 37; *Worcester E. L. Co. v. Attwill*, 23 F. (2d) 891, P.U.R. 1929B, 5; *East Ohio Gas Co.* (Ohio 1934), 4 P.U.R. (n.s.) 433; *Lincoln County P. Co. v. Itself* (Me.), P.U.R. 1919C, 862; *Re St. Joseph H. Co.* (Ind.), P.U.R. 1919A, 255.

money to invest.—*Re Consolidated Gas, E. L. & P. Co. (Md.)*, P.U.R. 1921D, 705.

The Montana Commission, in denying authority to increase municipal plant rates, stated the rule that a public utility, whether municipally or privately owned, is entitled to a fair and reasonable return upon present value, but that a municipality should not be allowed rates sufficient to enable it to pay for its water system. The commission also ruled that none of the funds from the water system should properly be diverted for town expenses which have nothing to do with the water system. Moreover, the town must as a consumer pay for water used for public purposes.—*Re Thompson Falls (Mont. 1938)*, 22 P.U.R. (N.S.) 337.

SECTION V

DISCRIMINATION

CHAPTER XVIII

DISCRIMINATION IN RATES

General.—One form of discrimination is based on unequal charges to different customers for substantially the same amount and kind of service rendered.

Discrimination is the breach of that duty incumbent on one to treat alike all with whom he deals. As applied to public utility corporations, discrimination means an inequality of service or rates among its customers. An arbitrary difference in the price charged for electric current necessarily amounts to discrimination.—*Dallas Power & Light Co. v. Carrington (Tex. Civ. App.)*, 245 S.W. 1046, P.U.R. 1923C, 137.

Therefore, it is necessary to determine the total net amount of the service rendered, and this can be accomplished by stating the benefits in dollars and cents. That is, if a certain customer is allowed a rebate or a discount of a certain amount on his monthly bill for electricity because he has given the electric utility right-of-way privileges over his property, this fact does not alone justify the lower rate to him. It must be shown that the value of the right-of-way privilege is equal to the discount or rebate allowed. The first essential is then to reduce all the factors (services performed and compensation therefor) to a monetary basis.

Discrimination, if we define it as the imposition of unequal charges for the same service, will be found to exist in all walks of life and over the entire country. The United States Post Office Department carries a letter from the Atlantic to the Pacific Coast for the same amount as it charges to carry it from one city to the next. The charge per ounce for letters is much higher than for parcel post or for newspapers and magazines. One might say that the person sending a letter from one city to the next is discriminated against. Also, a person sending first-class matter

weighing 1 lb from one city to another may feel that, because 1 lb of parcel-post matter can be sent for 7 cents, he is being discriminated against when he is obliged to pay 48 cents. However, it cannot be said that the post office charges different amounts to different individuals for carrying the same amount of the same kind of mail the same distance.

In the matter of taxation, there likewise exist possibilities of discrimination. Real-estate and personal-property taxes are assessed on the basis of "assessed valuation," which varies in each state from a few per cent of the full and true value to 40 and 50 per cent. Sales taxes are imposed on some commodities and not on others. Some kinds of business are required to pay license fees and others are not.

Something further might be brought into the picture, and that is the damage suffered by the party paying the higher charges. In other words, discrimination may exist; but if no damage can be proved to exist because of the discriminatory charges, no one suffers, and this is the underlying basis for anti-discrimination laws. For example, if two shoe stores of the same size in the same city use exactly the same amount of electricity during the same hours of the month and the utility charges one a lesser amount than the other, the second is damaged by the extent of this difference, for this dealer's profits will be less by this amount.

"The fundamental principle at the bottom of every prohibition against discrimination in matters of public service, is that such discrimination gives one individual or commodity a business or pecuniary advantage over another,—that the gain of the one is at the expense of the other." *Farmers' Ass'n v. Chesapeake & Potomac Tel. Co.*, 5 Md. P.S.C. 167. "Discrimination in rates is more offensive than excessive rates, because within reasonable limits shippers can adjust themselves to high rates, but not to unequal rates." *Griffin Bros. v. Maine Central R. Co. (Maine)*, P.U.R. 1916A, 27. "Rates may be fixed in view of dissimilarities in conditions of service, if there is some reasonable proportion between the variance in the conditions and the variance in the charges, and if dissimilarities are in truth the basis of the schedule and not a mere pretext or cover for the partiality." *Postal Teleg. Cable Co. v. Associated Press*, 228 N.Y. 379, 127 N.E. 256, P.U.R. 1920E, 1.

The homely expression, "One man's dollar is as good as another man's dollar," expresses the requirement of what constitutes nondiscriminatory practice. In the following sections, although

the distinction among lawful, unlawful, and unjust discrimination is not always clearly set forth, nevertheless, it appears that this distinction was in the minds of those rendering the later decisions, although it may not have been so stated. "There must be a difference in rates under substantially similar conditions for substantially the same service to constitute unjust discrimination." *Re New York Tel. Co. (N.J.)*, P.U.R. 1928D, 254.

Early Consideration.—In the early operation of railroads and other forms of public utility, the utility itself fixed the rates without review either by courts or commissions. Not only were rates sometimes unreasonable and excessive but they were not uniform among customers for the same conditions of service, *i.e.*, distance and the same class of goods. In some cases large shippers were given rebates according to the volume of their business. These rebates and special rates gave such shippers unfair advantage over other shippers and made it difficult for the less favored to compete in a certain territory. Under common law, it was not considered that such differences in rates or conditions were sufficient cause for any local complaint.

"Where carriers charged a shipper a reasonable sum for carrying goods, the fact that it charged another shipper less was held not to justify a recovery of excess. 'The charging of another too little is not charging you too much.'" *Garton v. Bristol & E. R. Co.*, 101 Eng. Com. Law Rep. 153, Best & Smith Q.B. Rep. 112. "The carrier may demand a reasonable rate for service rendered." *Bastard v. Bastard*, 2 Shower 82. "The commonness of the duty to carry does not involve a commonness or equality of compensation or charge. All a shipper can ask of a common carrier is that for the service performed he shall charge no more than a reasonable sum to him. Whether the carrier charges another more or less than the price charged a particular individual, may be a matter of evidence, and the difference between the charges cannot be made the measure of damages in any case, unless it is established by proof that the smaller charge is the true and reasonable charge and that the higher charge is excessive to that degree." *Johnson v. Pensacola & Perdido R. Co.*, 16 Fla. 623.

These views of discrimination were gradually changed in this country after the establishment of commissions and by the decisions of the higher courts.¹

¹ *Farmers' Ass'n. v. Chesapeake & Potomac Tel. Co.*, 5 Md. P.S.C. 167; *Re Pacific Gas & E. Co. (Cal.)*, P.U.R. 1920E, 597; *Bibber-White Co. v.*

"Both under the common law in this country and under the public utility statutes undue discrimination is unlawful." *Texas & Pacific R. Co. v. Interstate Commerce Comm.*, 162 U.S. 197, 40 L. ed. 940, 16 Sup. Ct. 666. "We may conclude that in this country, independently of statutory provisions, all common carriers will be held to the strictest impartiality in the conduct of their business, and that all privileges or preferences given to one customer, which are not extended to all, are in violation of public duty." *Cook v. Chicago, R.I. & P. R. Co.*, 81 Iowa 551, 46 N.W. 1080, 9 L.R.A. 764. "Rates to be valid must not be unjust, unreasonable, unjustly discriminatory, or unduly preferential." *Re Link Belt Co. (Ind.)*, P.U.R. 1922C, 385.

Later Views on Discrimination.—The Interstate Commerce Commission is empowered by Congress to fix the rates for interstate transportation of goods and passengers. The state commissions are empowered to fix these same rates within the limits of the state for intrastate commerce. The intrastate rates must harmonize with those established by the Federal Commission. When these intrastate rates are too high or too low, it is then the duty of the commissions or the courts to adjust these rates to conform to those of the Federal Commission. The states have sometimes complained that this adjustment is an infringement of their rights, and many controversies have arisen.¹ Sometimes the services or conditions of shipment are enough dissimilar to justify a difference in the classification in rates. However, railway fares that have induced some company to locate in a particular section of the country cause an equity in behalf of that company.² Rates to municipalities are sometimes discriminatory, either from granting free service or from giving the municipality a lower rate than justified in comparison with rates charged other customers. Such discrimination cannot always be eliminated at once, because the budget of the city may be fixed for the ensuing year on the basis of the lower rates.³ In such cases, it is very difficult for a customer to determine the

White River Valley R. Co., 175 Fed. 470; *Hayes & Co. v. Pennsylvania Co.*, 12 Fed. 309; *Re Boston Consol. Gas Co. (Mass. 1936)*, 12 P.U.R. (N.S.) 113.

¹ *Re Northern Pacific R. Co. (Minn.)*, P.U.R. 1926D, 693; *Seaboard Air Line R. Co. v. Florida ex rel. Ellis*, 203 U.S. 261, 51 L. ed. 175, 27 Sup. Ct. 108; affirming 48 Fla. 129, 37 So. 314; *Interstate Commerce Comm. v. Louisville & N. R. Co.*, 118 Fed. 613; *Brown v. Louisville & N. R. Co.*, 7 I.C.C. 224.

² *Re Hudson Valley R. Co. (N.Y. 2d Dist.)*, P.U.R. 1919B, 443.

³ *Western Electric Co. (N.D.)*, P.U.R. 1923C, 820.

amount of damages suffered because the city wherein he resides receives a lower rate than he does for a similar service. The use to which the utility service is put by the city is usually not of such a nature that the customer is damaged except to the extent that he is paying a higher rate or charge than he otherwise would if the city were paying its just share of the costs of service. On the other hand, his taxes are less than if the city were paying a higher rate for the utility service. Hence, it follows that even though discrimination in favor of the municipality exists, no individual customer can prove sufficient damages to make it worth his while to press his claim.

Long use of special rates for service does not justify a continuance of these rates, for "abuses of power and violations of right derive no sanction from time or custom."¹ Neither do promises of promoters made to prospective patrons have any binding effect on a commission or court.²

Discrimination is sometimes justified for a temporary period when it exists for the purpose of conducting an investigation or for accomplishing a certain result. In order to determine the practicability of performing a particular operation by using electricity instead of some other form of energy, it may be necessary to experiment and to charge the customer no more for the electrical energy than he would have paid had he used the original source of energy. Several state commissions introduced the so-called "objective," "cross-over," and "intermediate" rates where different charges were made for the same amount of service rendered (see Chap. XXII). Damages that any customer might claim were, however, small, and this may explain the lack of such claims.

In concluding, it might be said that, even though there appears to be no justification for discrimination, nevertheless, it may sometimes be permitted because of lack of material damages to

¹ *Civic League v. St. Louis Water Dept.* (Mo.), P.U.R. 1917B, 576.

² *Re Coos Tel. Co.* (N.H.), P.U.R. 1918F, 592; *San Antonio Traction Co. v. Altgeld*, 200 U.S. 304, 50 L. ed. 492, 26 Sup. Ct. 261; *San Antonio v. San Antonio Pub. Service Co.*, 255 U.S. 547, 65 L. ed. 777, 41 Sup. Ct. 428, P.U.R. 1921D, 412; *Houston v. Southwestern Bell Tel. Co.*, 259 U.S. 318, 66 L. ed. 961, 42 Sup. Ct. 486, P.U.R. 1922D, 793; *Nichols on Public Utility Service and Discrimination*, p. 859; *Fesler v. Pacific T. & T. Co.*, 4 Cal. R.C.R. 711; *Cook v. Chicago, R. I. & P. R. Co.*, 81 Iowa 551, 46 N.W. 1080, 9 L.R.A. 764; *Re New Hartford Water Co.* (Conn.), P.U.R. 1930C, 22; *Caswell v. Bloomsburg Water Co.* (Pa.), P.U.R. 1921B, 588.

others or because it is agreed to by all parties concerned that the discrimination is justified by the results expected. In other words, it may continue to exist because of sufferance or tolerance. We must distinguish here between different charges for the same unit sales. Such a variation may occur many times and in many cases and still not constitute unjust discrimination. This may be due to the fact that the unit upon which the charges are based represents only one of the many factors entering into the cost of rendering the service, and different unit charges are made for different kinds of service to compensate the utility for some or all of the other *components* of the cost, which are incapable of being measured except indirectly and possibly at very considerable expense.

Elimination of Discrimination.—The question of what really may be classed as discrimination in charges is difficult to answer in some cases. It is not to be assumed that all must pay the same rate for service regardless of the quality of service, the time at which the service is rendered, or other circumstances that determine the cost of such service. Electrical customers requiring service at the time of the peak load should pay a higher rate for the service than those not requiring it at that time, for the amount of generating equipment required is determined by the size of the peak load. Those who receive service from the same investment in generating equipment at periods of small load do not add to the capital charge for the generating equipment itself and should be permitted to receive lower rates for this class of service. The laws requiring uniform rates do not contemplate that the same unit rate shall be charged to all. Special circumstances of guarantee of service and other conditions of the customer's installation will also be sufficient to permit a difference in classification for rate purposes.¹ The supply of service to some at less than cost does not justify giving that rate to all customers.² This is especially true when competition must be met, as will be explained later.

¹ Department Pub. Service v. Puget Sound P. & L. Co. (Wash. 1936), 11 P.U.R. (N.S.) 76; Public Service Comm. v. Utah P. & L. Co. (Utah 1937), 16 P.U.R. (N.S.) 493.

² Re Brookline Petitions, 9 Mass. Gas & E. L. Comm. 26; Re Lincoln T. & T. Co. (Neb.), P.U.R. 1924B, 466; Re Detroit Edison Co. (Mich.), P.U.R. 1933E, 195.

What Constitutes Unjust and Unlawful Discrimination.—The following citations set forth in a general way some of the answers as to what constitutes unjust and unlawful discrimination:¹

"Discrimination must be unjust to be unlawful, and to be unjust it must be shown that rates to preferred points are not justified and the conditions are the same as at the point alleged to be damaged. The mere showing that rates from one point in a territory are higher than rates from other points in that territory, whether sustained by the same or different carriers, does not establish the fact of undue prejudice or preference." *Sperry Flour Co. v. Island Transportation Co. (Cal.)*, P.U.R. 1928A, 564. "There must be a difference in rates under substantially similar conditions for substantially the same service to constitute unjust discrimination." *New York Tel. Co. (N.Y.)*, P.U.R. 1928D, 254. "The practice of a municipal utility of charging some flat-rate water consumers less than the lawful rate, while others are charged more, was held to be discriminatory." *Skogmo v. River Falls (Wis.)*, P.U.R. 1917E, 964. "The failure of a motor carrier to adhere to its published schedule by charging express rates for freight and freight rates for express results in unlawful discrimination in the matter of charges against its patrons and in unfair competition with a railroad operating between the points served by the motor carrier." *Re Salt Lake & Utah R. Co. (Utah)*, P.U.R. 1925A, 154. "A public utility is under obligation, moral and legal, to treat all contractors alike in making rates for service to be used in building operations, and to advise them in advance just what such rates will be." *Re Special Contracts by Gas & Electric Companies (N.Y.)*, P.U.R. 1931E, 302.

Free Service.—Free service constitutes one form of discrimination that is disapproved by the courts and commissions. A provision for free service in any contract for the sale of a property or service or in a franchise agreement with a municipality is discriminatory. Free service to some customers throws the burden on the others to pay the entire cost of the utility service. Free service to a municipality, for its water, electricity, or other form of service, is just as discriminatory as any other class of free

¹ *Taylor v. Northwestern Water Co. (Idaho)*, P.U.R. 1916A, 372; *Snell v. Clinton E. L. H. & P. Co.*, 196 Ill. 626, 63 N.E. 1082, 58 L.R.A. 284; *Cullen Hotel Co. v. Union Pacific R. Co. (Utah)*, P.U.R. 1923B, 524; *Dallas P. & L. Co. v. Carrington (Tex. Civ. App.)*, 245 S.W. 1046, P.U.R. 1923C, 137; *Re New York Tel. Co. (N.Y.)*, P.U.R. 1928D, 254; *Coggeshall Launch & Towboat Co. v. Cousins Launch & Lighter Co. (Cal.)*, P.U.R. 1928D, 591; *American Window Glass Co. v. Pennsylvania R. Co. (Pa.)*, P.U.R. 1918B, 80; *Spillman v. Interstate P. Co. (Neb.)*, P.U.R. 1929E, 358.

service. The argument is sometimes advanced that such municipal free service is not discriminatory because the other customers are also citizens of the same municipality and that if the free service is not furnished their taxes must be increased to meet this additional municipal expense. Two fallacies in such an argument are seen to be that the taxes should not be distributed on the basis of the amount of utility service used by each customer and that by foregoing such payments to the utility for service the city is able to show a lower tax rate than really exists, for part of the tax burden is collected by the utility furnishing the free service.¹

The furnishing of free service, either voluntarily or in conformation to a municipal requirement or franchise, is contrary to the theory of state regulation of public utilities, since no service can be rendered that does not require some expense, and free service to some customers necessitates an additional burden on others.—*Re Fayetteville Gas & E. Co. (Ark.)*, P.U.R. 1920E, 155.

Money Not the Only Compensation.—Sometimes an agreement is made in a contract for the delivery of services for some form of compensation other than money. This form of contract comes about in the sale or exchange of property between a customer and the utility. A water utility may have secured wells on the property of a customer or an easement right across his property. In exchange for this special privilege, an agreement is made to furnish the former owner free service or service at a reduced price in lieu of rent. A railroad may issue a perpetual pass in the place of payment of money to an individual for some special privilege. Such contracts are not usually allowed because they are discriminatory in nature. It is impossible to determine the money value of these special agreements. Others paying money for such service may be discriminated against as mentioned in the following citation:

Values of property other than money rest solely within the judgment of men. There is no fixed standard by which a certain quantity of property of any kind can be said to equal at all times a definite sum

¹ *Re Pacific Gas & E. Co. (Cal.)*, P.U.R. 1927D, 145; *Re Rixman Tel. Co. (Ill.)*, P.U.R. 1916A, 141; *Re Dakota Central Tel. Co. (S.D.)*, P.U.R. 1915D, 1054; *Re Century Pacific Lines (Ariz.)*, P.U.R. 1932C, 388; *Re Detroit Edison Co. (Mich.)*, P.U.R. 1933E, 195; *Re Beaver Brook Water Co. (Pa. 1935)*, 7 P.U.R. (N.S.) 159.

of money. Confusion, discrimination, and inequality would certainly attend such contracts if permitted under the law.—*Re Illinois Press Ass'n.*, 1 Ill. P.U.C. 241.

A similar decision was made by the West Virginia Supreme Court in *Shrader v. Steubenville E. L. & B. Valley Transit Co.*, 84 W. Va. 1, 99 S.E. 207, P.U.R. 1919D, 895.

No special contract shall be made to give preference in rates to a utility consumer because of a utility's use of the consumer's property, but such consumer shall be billed at the regular rate for the utility service rendered and the utility shall pay to the consumer a fair and reasonable compensation for the facilities used.—*Re Special Contracts by Gas & E. Companies (N.Y.)*, P.U.R. 1931E, 302.

Special Rates and Special Contracts.

Special rates should be discontinued, so that what is offered to any one customer shall be open to all under like circumstances who desire to avail themselves of the company's terms and who seek the company's service.—*Re Milford Electric Petitions, (Mass.)*, P.U.R. 1915B, 577. See also *Re Hannes L. & P. Co. (N.D.)*, P.U.R. 1921B, 391; *Re Montana L. & P. Co. (N.D.)*, P.U.R. 1920F, 928.

Such special contracts are sometimes made before passage of laws creating commissions to deal with utility problems in a given state, and sometimes they grow out of sharp competition between different carriers or utilities performing like service in a given district.¹ However, special conditions of loading, volume of movement, character of load, and time at which the load is demanded are sufficient to warrant a classification granting a special rate;² but such rates should be available to all engaged in the same business and having like conditions of load. A lower rate given to customers taking electricity who also purchase heat from the same utility was disapproved.³

"Notwithstanding the rules against deviation from schedules, either a municipal corporation owning its own plant or a privately owned utility, may require special rates proportional to the expense of the

¹ *Re Salt Lake & Utah P. Co. (Utah)*, P.U.R. 1925A, 154; *Re United Parcel Service of Los Angeles, Inc. (Cal.)*, P.U.R. 1933C, 267; *Skogmo v. River Falls (Wis.)*, P.U.R. 1917E, 964; *Public Util. Comm. v. Duquesne Light Co. (Pa. 1937)*, 20 P.U.R. (N.S.) 1.

² *Re Eastern Motor Freight Bureau (Conn. 1937)*, 20 P.U.R. (N.S.) 50.

³ *Pacific Gas & E. Co. (Cal.)*, P.U.R. 1920E, 597.

particular service." *Souther v. Gloucester*, 187 Mass. 552, 73 N.E. 558, 69 L.R.A. 309; *Ladd v. Boston*, 170 Mass. 332, 49 N.E. 627, 40 L.R.A. 171. "A special contract relating to charges for towing logs of a particular shipper would result in a preference in favor of the shipper and a discrimination against other companies having logs in the vicinity." *Stimson Lumber Co. v. Northwestern Towboat Owners Ass'n.* (Wash.), P.U.R. 1925B, 31; affirmed 275 U.S. 207, 48 Sup. Ct. 41, P.U.R. 1928B, 258.

Rebates.—In the earlier days of railroad operation, it was common for rebates to be given to large shippers of certain commodities. These rebates were thought to be proper, for the railroads needed the patronage of these shippers. There was no law forbidding such a practice and no commission to which to appeal such a case for determination. A similar practice grew up in other utilities. Instead of classifications and rate schedules to fit these classes, rebates or discounts were given. Two Federal court cases are cited in the earlier of which the rebate is forbidden:

"Where there was no state law forbidding rebates on intrastate shipments, it was thought that a rebate on such shipments was lawful." *Bibber-White Co. v. White River Valley E. R. Co.*, 175 Fed. 470. "Rebates to large shippers were held to be discriminatory and all shippers were allowed to recover the difference between the higher rate and the rate to the most favored shipper. Everybody constituting part of the public is entitled to equal and undiscriminatory participation in public facilities." *Hays & Co. v. Pennsylvania Co.*, 12 Fed. 309.

The practice of granting rebates has now been universally declared to be discriminatory, and such practice is no longer permitted.

Service Classifications.—Every utility is faced with the necessity of classifying its customers and making these classifications the basis of determining the application of its rate schedules. These classifications should be made on the basis of cost of service rather than upon the nature of the customer's business or upon any arbitrary decision. When such classifications have been made, the question arises as to who shall determine under what rate schedule each customer may be classified. Shall the utility be held responsible for notifying each customer which schedule of several available will give him the lowest charge for his service? The answer to this question is usually that the responsibility is upon the customer rather than upon the utility and that the cus-

tomer has no recourse at law to collect damages from the utility for failure to notify.¹ It is the usual practice of utilities to notify customers of all rates that may be available to them. It is, however, impossible for a utility to accept the responsibility of notifying a customer that it will be to his advantage to select a particular schedule which may be available to him unless at the same time the customer advises the utility what his requirements will be in the future. Very few customers are able to do this; so it becomes practically impossible for the utility to assume the responsibility of placing a customer on the most advantageous of several optional schedules. Notification of new and optional schedules and charges is effectively given through newspapers and by bill inserts. As an instance, the charge for party-line telephone service is usually much lower than that for individual-line service, and the utility should notify the prospective customer at the time application for service is made of the several kinds of service available, so that he can make his own selection.²

In making classifications for electric service, a consideration of demand, time of use, amount used, and load factors should be taken into account, and each customer should be placed in the classification that most nearly meets his use. After he has been receiving service for some time, a determination of his demand and load factors may disclose the advisability of reclassification.³ Mere inequality of charges does not constitute discrimination.⁴ The following citations hold this to be the case:

"Mere inequality of charges does not constitute undue discrimination if there be an inequality of conditions and circumstances." *Interstate Commerce Comm. v. Chicago Great Western R. Co.*, 141 Fed. 1003; *National Dry Dock & Storage Warehouse Co. v. Boston & Albany R. Co.*,

¹ *Maison v. Commonwealth Edison Co. (Ill.)*, P.U.R. 1927C, 1; *Technical Glass Co. v. Southern Cal. Gas Co. (Cal.)*, P.U.R. 1931B, 447.

² *Re Greens Fork Co-operative Tel. Co. (Ind.)*, P.U.R. 1927C, 688; *Postal Teleg. Cable Co. v. Associated Press*, 288 N.Y. 370, 127 N.E. 256, P.U.R. 1920E, 1.

³ *Devils Lake Steam Laundry Co. v. Otter Tail P. Co. (N.D.)*, P.U.R. 1929D, 342; *Re Joplin Waterworks Co. (Mo.)*, P.U.R. 1915C, 125; *Scranton-Spring Brook Water Supply Co. (Pa.)*, P.U.R. 1929B, 298; *Illinois Commerce Comm. v. Rockford E. Co. (Ill.)*, P.U.R. 1929E, 498.

⁴ *Civic League v. St. Louis Water Dept. (Mo.)*, P.U.R. 1917B, 576; *Frazier v. City of Pueblo (Colo. 1935)*, 10 P.U.R. (N.S.) 337; 25 *Customers v. Brooklyn Edison Co. (N.Y. 1937)*, 18 P.U.R. (N.S.) 241.

2 Mass. P.S.C.R. 163. "While a rate schedule, designed to recognize more generally a distinction between off-peak demands and peak period demands, making a lower rate for the former demands available to a larger group of consumers, might have merit, it does not follow that a rate failing to do so is necessarily discriminatory or illegal, nor does it follow that peak to off-peak demands, recognizing the distinction on one side of that point and not recognizing it on the other is illegal." *Balaban & Katz Corp. v. Commonwealth Edison Co. (Ill.)*, P.U.R. 1929D, 305. "A classification approved by a commission, which embraced in one class consumers guaranteeing a minimum demand of 500 kilowatts for combined electric railway and commercial uses, which has application to interurban companies procuring current from a power company at or beyond the limits of the city within which the power company was located, and in another class electric railways guaranteeing a minimum demand of 20,000 kilowatts for electric railway purposes only, and which demand was constant and steady, such service being in the city and within relatively short transmission distance, was declared a lawful and reasonable classification." *Cleveland & Eastern Traction Co. v. Public Util. Comm.*, 106 Ohio St. 210, 140 N.E. 139, P.U.R. 1923D, 853.

Uses of the Product.—The use to which the service is put cannot by itself be made the reason for a special rate classification.¹ This general rule is to be followed, but a special case is sometimes made in considering natural-gas rates in territories obtaining gas from limited sources of supply. In such cases, inverted block schedules, in which the unit price is greater for large than for small amounts, are sometimes used so that the large consumer of gas for industrial or heating purposes will have to pay more per unit than the rate charged a residence consumer. The use of these schedules is wholly for the purpose of conserving the remaining supply for the use of the greatest number of persons who have equipped their homes for its use. However, in fields where there is an adequate supply of gas, such rates do not apply.

After natural gas has been delivered to a patron, the use to which he may apply it cannot be made the basis of discrimination, so as to permit

¹ *Arizona Corp. Comm. v. Morenci Water Co. (Ariz.)*, P.U.R. 1916E, 387; *Hines v. Joplin Waterworks Co. (Mo.)*, P.U.R. 1920B, 943; *Salisbury & S. R. Co. v. Southern P. Co.*, 179 N.C. 18, 101 S.E. 593, 12 A.L.R. 304, P.U.R. 1920C, 688; *Re Murphy Water, Ice & L. Co. (Cal.)*, P.U.R. 1916B, 719; *Re Puget Sound Navigation Co.*, 157 Wash. 557, 289 Pac. 1006, P.U.R. 1930E, 289; *Kolb Cleaning & Tailoring Co. v. Mississippi P. & L. Co.*, 166 Miss. 136, 145 So. 910, P.U.R. 1933C, 463; *Re Market S. R. Co. (Cal. 1937)*, 17 P.U.R. (N.S.) 13.

the company to differentiate in the price. It was sought to compel large consumers to pay a higher price for the increased consumption on the theory that they were using gas for heating purposes, which use should be discouraged.—*Erie v. Penna. Gas Co. (Pa.)*, P.U.R. 1920B, 396.

Discrimination in water rates for certain users such as laundries, saloons, and restaurants has been eliminated by commissions by prescribing a schedule of minimum rates based on the size of the meter and service connection. Water-heating rates for electrical energy should not be placed in a preferred class unless the load characteristic is such as to justify such special consideration as may be occasioned by it being strictly an "off-peak" use.

"There is no reason why the use of electric energy for water heating should be in a preferred class. The mere fact that only a small number of customers can avail themselves of electric water heating service because of restrictions imposed is no justification whatever to the establishment of a rate with such conditions imposed that others may not have the same privileges." *Re Niagara, Lockport & Ontario P. Co. (N.Y. 1935)*, 9 P.U.R. (N.S.) 250. "Electric water heater flat rates, amounting to less than the actual average cost to the utility of the generated and purchased current used, were held to be an unjust burden on the other consumers of the utility and were ordered to be discontinued." *Re Kaukauna E. & Water Co. (Wis.)*, P.U.R. 1929E, 491.

In general, it may be said that, except for resale purposes, what the service is used for is of very little concern to the utility. If, however, the use of utility service for one particular operation (as power used during the daytime vs. lighting used during hours of peak load) is of such a nature that special consideration and some concessions are justified, a special-purpose rate may be devised. In other words, the justification must be from the viewpoint of cost to serve or advantages accruing to the utility's other customers rather than from the viewpoint of the value to the customer.

Competition and Sale to Competitors.—There are, in general, two classes of customers of electrical utilities, the first consisting of the residential and commercial consumers who are wholly dependent upon the company for their supply of electricity and the second composed of those who may furnish all or part of their own energy. To the first class, the company may dictate the price except as guided by business prudence or by orders of com-

missions or courts. To the second class, the utility must either fix a price that will secure the customer's business or else go without it. This second class of customers is usually composed of the largest users of energy for industrial purposes. Since the utility is able to supply these large users on a more or less incremental basis, serving them in the long run lowers the unit cost of production and permits the utility to lower rates to residential and commercial customers, provided that the rates are so fixed as to more than cover the additional cost of production and delivery of the energy. It is, therefore, proper to place such customers in a classification of large power users receiving a lower schedule of rates.¹

The company's customers may be broadly divided into two groups, those who are dependent upon the company for their supply and those who may readily supply themselves in other ways or by other forms of power. To the first the company may dictate the price, controlled only by motives of business expediency, its own sense of justice, and its duty as a public servant. To the second the company must fix the price so as to secure the customer's business or else go without it. The variety and wide range of prices offered by the company are ample evidence of its recognition of these facts. The city, with respect to its municipal arc system, plainly belongs in the first class.—*Worcester E. L. Co. v. Worcester*, 28 Mass. Gas & E. L. Comm'rs 15.

Competition exists with other forms of service such as that of the railroads with water and motor-truck transportation, of electrical utilities with gas utilities, and of private utilities with those owned and operated by municipalities and other branches of the government. In these latter cases, the utility must either meet the rates of its competitor or else lose the business and perhaps its investment. Commissions usually permit such a utility to meet the lower rates in order to hold the business. Such a utility may then face the charges of discrimination from other localities or customers where the rates have not been lowered. The usual ruling is that there is no discrimination between communities in such cases because such rates are usually temporary

¹ Re Public Franchise League, 24 Mass. Gas & E. L. Comm'rs 20; Re Green Bay Water Co. (Wis.), P.U.R. 1918F, 59; Re Boston Consol. Gas Co. (Mass. 1936), 12 P.U.R. (N.S.) 113, 14 P.U.R. (N.S.) 433; Modesto Irrig. Dist. v. Pacific Gas & E. Co. (Cal.), P.U.R. 1932B, 203; Re Edison E. Ill. Co. (Mass.), P.U.R. 1928D, 859.

in nature.¹ When service is requested by a competitor and the utility agrees to serve, it must be on the same rate schedule available to others of the same class.²

Discrimination among Localities.—Discrimination among localities is sometimes claimed against a utility. A difference in rates is sometimes justified when one locality is nearer the source of supply than another or one is on a higher level than another, thus requiring more power for pumping.³ Rural consumers claim the same rates as apply in the nearest city. When these rural consumers are only suburban in nature and are fed from the same lines with no well-defined division of territory except that of a city boundary line, a different rate is not usually justified.⁴ Whether or not the charging of different rates for the same class of service in two localities that are supplied electricity from the same transmission line constitutes discrimination is a moot question. It has already been shown that a difference in the cost of supplying the service is sufficient justification for a different rate level, so that any differences in charges must be in accordance with the difference in the cost to serve, based upon definite supporting data. Because of the difficulty of establishing acceptable and accurate supporting data and because of the ill will resulting from having different schedules for communities of nearly the same size supplied from the same transmission system, the practice of charging the same rates is generally

¹ *Whedon v. New York C. & H.R.R. Co.*, 2 P.S.C. N.Y. (2d Dist.) 526; *Re Georgia P. Co.* (Ga.), P.U.R. 1931E, 449; *Re Niagara, Lockport & Ontario P. Co.*, 229 App. Div. 295, 241 N.Y. Supp. 162, P.U.R. 1930D, 58.

² *Postal Telegr. Cable Co. v. Cumberland T. & T. Co.*, 177 Fed. 726; *Salisbury & Spencer R. Co. v. Southern P. Co.*, 179 N.C. 18, 101 S.E. 593, 12 A.L.R. 304, P.U.R. 1920C, 688; *Hetland v. Pacific Gas & E. Co.* (Cal. 1935), 7 P.U.R. (n.s.) 275.

³ *Re West Ohio Gas Co.* (Ohio), P.U.R. 1928C, 25; *Aledo v. Northern Util. Co.* (Ill.), P.U.R. 1928C, 67; *Eau Claire v. R. Comm.*, 178 Wis. 207, 189 N.W. 476, P.U.R. 1922D, 666; *Scranton v. Scranton-Spring Brook Water Supply Co.*, 105 Pa. Super. 203, 160 Atl. 230, P.U.R. 1932C, 471; *Re City of Plymouth Water & L. Comm.* (Wis. 1934), 2 P.U.R. (n.s.) 462; *Re California Water Supply Co.* (Cal.), P.U.R. 1933B, 392; *Kentfield v. Pacific Gas & E. Co.* (Cal. 1936), 13 P.U.R. (n.s.) 400.

⁴ *Re Champaign & Urbana Water Co.* (Ill.), P.U.R. 1919E, 798; *Thayer v. Beaver Valley Water Co.* (Pa.), P.U.R. 1916E, 962; *City of Elmhurst v. Western United Gas & E. Co.* 263 Ill. 144, 1 N.E. (2d) 489 (1936), 13 P.U.R. (n.s.) 441.

followed. Some utilities have even gone so far (Consumers Power Company and Detroit Edison Company of Michigan) as to charge the same rates throughout their entire territories, which consist of large cities and the surrounding suburban and rural territory. One might say that the cost of service theory has been disregarded in such cases and a socialized theory of rate making has taken its place. Such a rate policy is sound where the "lean" business is not too large a percentage of the total. If the lean business is a very large proportion of the total, this policy may result in retail prices in the urban centers at a higher level than such urban customers would be obliged to pay if served by an independent plant, and hence the utility may find its business the lean rural business and thus face a serious situation.

An early case of discrimination was claimed against railroads that had different rates to a central shipping point in different states or between different communities in the same state. Two such cases were decided early, one by the Supreme Court and the other by a Federal court, as follows:

"A railroad is not bound to give the same rates to people of all the states which it serves, although it may not discriminate." *Smyth v. Ames*, 169 U.S. 466, 42 L. ed. 819, 18 Sup. Ct. 418. "The fact that freight rates are not the same in two states does not necessarily show discrimination unless the elements that enter into the problem of reasonable rates are the same." *Ames v. Union Pacific R. Co.*, 64 Fed. 165.

When a utility serves several cities from the same transmission line and gives free service in some of the cities, the other cities not so favored may claim discrimination if they are charged the same rates for other classes of service. The utility must treat all alike as to rates and service. In the same manner, where one city charges a utility a gross income tax and the other cities do not, this item of expense must be charged against the city levying the tax. Rates for such a city should be higher than those for the other cities served by the same utility; the utility becomes a collecting agency for these taxes in the city that imposes the gross earnings tax.

"The action of an electric utility, operating through an entire state, in voluntarily reducing rates in a certain city to meet local rate cuts by a competing municipal plant over which the commission has no

jurisdiction, does not unlawfully discriminate against customers of the privately owned utility in other territory." *Re Georgia P. Co. (Ga.)*, P.U.R. 1931E, 449. "An electrical utility, by merely meeting the rates of a competitor within a certain territory in order to hold its business, does not create an unjust or unlawful discrimination against other localities served by it, and accordingly does not offend the statute against locality discrimination." *Modesto Irrig. Dist. v. Pacific Gas & E. Co. (Cal.)*, P.U.R. 1932B, 203. "The utility is justified in charging higher rates for electricity in a community which charges an occupational tax than in others furnished from the same system and in which no tax is imposed." *Re Gasconade P. Co. (Mo.)*, P.U.R. 1930E, 45.

Opinion appears to be unanimous that cities similarly served and situated should be given the same rates to avoid discrimination, but, if dissimilarity in cost to serve can be shown, different rates will not be unlawfully discriminatory.

Unlawful discrimination exists when an electric utility charges a higher rate in one of two adjacent municipalities similarly situated and served, under the same conditions, by the same plant, notwithstanding the fact that a rate low enough to come within a maximum fixed by franchise in the other municipality would prevent the utility from earning a return provided by the statutes.—*Dallas P. & L. Co. v. Carrington (Tex. Civ. App.)*, 245 S.W. 1046, P.U.R. 1923C, 937.

In Favor of Particular Parties.—Patrons with business affiliations with a utility have no right to special rates because of such affiliation. They must be classified according to the general system applying to all having the same type of service requirements and must pay the proper rate for this service.¹ In the same manner, another department of the same utility cannot receive preferential rates without discrimination between it and other customers. An electric utility cannot receive gas from another branch of the same utility without paying the proper rate; nor can the gas utility receive free or low-cost electric service from the other branch. An electric company owning a cotton gin or an ice and cold-storage plant in connection with its business cannot furnish electricity free or at low cost to these other departments.

"Electricity furnished to an ice department operated by an electric company should be metered and accounted for at regular power rates,

¹ Goodwin & Webb (Cal.), P.U.R. 1927D, 133.

thus placing the ice department on the same footing as any other power customer of the utility." *Re Marshall Ice & P. Co. (Ill.)*, P.U.R. 1922A, 361. "When a street railway and an electric plant are operated by the same company, the street railway is entitled only to the minimum rate authorized to be charged to wholesale industrial consumers." *Re Georgia P. Co. (Ga.)*, P.U.R. 1928A, 830.

In like manner, a natural-gas utility cannot sell its gas supply to a subsidiary for less than the price charged to others for a like service.¹ However, a railroad company has been allowed to permit a baggage and transfer company to place its agents on the trains of a railroad entering a particular terminal to the exclusion of all others and at a low or free transportation rate. This is to protect its passengers from the annoyance of competing agents on the same train and at the same time to give them the service required at the terminal.² A passenger is not obliged to contract for this service but may employ other agencies at the terminal.

The owners of a public utility are not entitled to exemptions from charges for service. In one case, a natural-gas utility was selling gas to a second utility, made up of officers of the first, for the purpose of extraction of gasoline before the gas was turned into the mains for distribution. The first utility was paid only a nominal sum for the privilege, whereas its officers, the second utility, were making large profits. The court ordered the officers to pay the first utility a fair price for the gasoline extracted. In the same manner, the owners of a utility must receive only their proper share of service in case of a shortage of supply.

The value of water supplied to the owners of a water utility should be charged on the books upon the same basis as water for other consumers,

¹ *Public Service Comm. v. Great Northern Util. Co. (Mont.)*, P.U.R. 1929B, 177; *Re Eastern Shore Gas & E. Co. (Md.)*, P.U.R. 1929E, 244; *Re United Fuel Gas Co. (W. Va.)*, P.U.R. 1918C, 193; *Charleston v. Public Service Comm.* 95 W. Va. 91, 120 S.E. 398, P.U.R. 1924B, 601.

² *Cullen Hotel v. Union Pacific R. Co. (Utah)*, P.U.R. 1923B, 524; *Re Fortine Water Rates (Mont.)*, P.U.R. 1925B, 535; *Merriman v. Luse Co. (Ore.)*, P.U.R. 1917F, 244; *Re Nail (Cal.)*, P.U.R. 1929C, 417; *Springfield v. Highland Util. Co. (Colo. 1935)*, 10 P.U.R. (N.S.) 381; *Re Public Util. Consol. Corp. (Ariz.)*, P.U.R. 1932D, 407; *Weaver v. Kirksville L. P. & Ice Co. (Mo.)*, P.U.R. 1915C, 114; *Re Electric Service & Rates (Mont.)*, P.U.R. 1922B, 360; *Public Util. Comm. v. East Providence Water Co. (R.I. Sup. Ct.)*, P.U.R. 1927C, 417.

although the owners give their time in the management of the company's business without making a charge therefor, and the services past rendered are deemed equivalent to the value of the water thus supplied.—*Re Seneca Artesian Water Co. (Mo.)*, P.U.R. 1923A, 648.

Stockholders of a company should not be put into a preferred class to receive service at reduced prices from the utility; they should be treated in the same manner as others who are not stockholders. Higher telephone rates for renters than for stockholders of the company should not be permitted, nor the requirement that any subscriber should purchase one or more shares of stock before he may receive service, for the utility in occupying the territory is the only convenient and economical source from which service may be obtained.¹ "The fact that a stockholder has purchased a share of stock in the company does not authorize the utility to supply him at a lower rate than non-stockholders are supplied." *Re Ettrick Tel. Co. (Wis.)*, P.U.R. 1915D, 695.

It is the custom of some utilities to give free service or service at a reduced price to officers and employees of the company. Such practice has been declared discriminatory and illegal, because it could not be justified as part of the salaries of such employees or officers. If, however, the management of the utility, for advertising or research purposes, feels that a discount from the regular schedule in effect in the community is desirable and the monetary compensation employees receive because of this discount is easily ascertainable, it does not seem unreasonable to allow the utility this privilege, but to do so would require the

¹ *Re Garfield E. Co. (Wis.)*, P.U.R. 1927B, 199; *Re Magnolia Farmers Tel. Co. (Ill.)*, P.U.R. 1927B, 92; *Re Clara City Tel. Co. (Minn.)*, P.U.R. 1921A, 656; *Re Farmers Mutual Tel. Co. (Mo. 1935)*, 8 P.U.R. (N.S.) 260; *Re San Antonio Home Tel. Co. (Cal.)*, P.U.R. 1922A, 705; *Re Parma Tel. Co.*, 17 Idaho P.U.C.R. 133; *Re St. Clair Farmers Mutual Tel. Co. (Ill.)*, P.U.R. 1915F, 585; *Re Arthur Mutual Tel. Co. (Ill.)*, P.U.R. 1927E, 374; *Re Carlisle Co-operative Tel. Co. (Ind.)*, P.U.R. 1915D, 774; *Re Northeast Kansas Tel. Co. (Kan.)*, P.U.R. 1916B, 925; *Re Onsted Tel. Ass'n (Mich.)*, P.U.R. 1922D, 90; *Wheeling Community Club v. Wheeling Tel. Exchange Co.*, 15 Mo. P.S.C.R. 514; *Knott v. Southwestern T. & T. Co. (Mo.)*, P.U.R. 1915E, 963; *Cook, v. Bradburn (Okla.)*, P.U.R. 1919C, 684; *Re Yamhill Mutual Tel. Co.*, 12 Ore. P.S.C. 56; *Re Springs Mutual Tel. Co. (S.D.)*, P.U.R. 1918A, 488; *Re Lake Shore Tel. Co. (Wis.)*, P.U.R. 1927D, 98.

charging of such discount to advertising or some other operating account.¹

"The practice of a gas company in furnishing its employees with a discount of 50 per cent, and its resident officials gas free of charge, is grossly discriminatory." *Re Helena L. & R. Co. (Mont.)*, P.U.R. 1920D, 688. "The practice of allowing directors, officers, and employees different rates of discount from those allowed other purchasers of electric current is illegal, and, where offered in favor of officers, cannot be justified on the ground that they receive no salary or other compensation." *Re Farmingdale L. Co. (N.J.)*, P.U.R. 1915E, 515.

Old patrons should receive no lower rates for service than new ones having the same load classifications. It is unlawful to solicit business of customers by assuring them of lower rates if they contract for the service before a certain date. Also:

An interstate telegraph company, leasing private wires by contract to press associations and newspapers, cannot justify discrimination among its customers by dividing the contracts into old and new and applying a different rate to each.—*Postal Teleg. Cable Co. v. Associated Press*, 228 N.Y. 370, 127 N.E. 256, P.U.R. 1920E, 1.

Distinction must be made here among utilities operating in states where the laws are different. It is questionable whether a utility, having made a contract to supply service at a low rate in the past, under a long-term contract, is obliged to serve any and all callers falling in the same category at the same contract rate. To do so would perhaps be disastrous for the utility and would probably retard progress. In the early days of the electrical industry when water powers were developed, it was customary to seek an available market—which could not always be found and when found required a low rate—as, for example, the supply of power to a large industrial establishment operating its own steam-generating plant, which would purchase its requirements at a unit rate less than its own production expense. In the judgment of the electric-utility management, the large hydroelectric development would have spare capacity sufficient to meet the requirements of the large industrial customer for ten or more years, and, therefore, a long-term contract, let us say, was consummated. However, the utility's business may

¹ *Libby v. Libby Water & E. Co. (Mont.)*, P.U.R. 1920E, 402; *Hess v. Iowa L. H. & P. Co.*, 207 Iowa 820, P.U.R. 1929A, 22.

have grown much faster than anticipated, with the result that at the end of 5 years the utility is faced with a shortage of generating capacity and it must install more. To force the utility to sell to a second industry at the same price as the first, knowing full well it can do so only at a loss, appears unreasonable. If this situation had been known in advance, the utility would probably have been forced to refrain from developing its business until the termination of such long-term industrial contract.

If the condition of service for new patrons is different from that for the old, as might be the case if the old patrons have contributed heavily in the first instance toward the extensions made to serve them and the newer customers have not done so, equity and justice demand that the rates and charges for the old patrons should be somewhat lower than those for the new because of their investment in the extensions. Such instances, however, may become rather involved, for it is not improbable that the operating expenses necessary for service to the old patrons may not be so low as those for the newer ones, on any allocation of expenses which may be made, in which event the utility may be justified in making no distinction between charges to old and new customers.¹

As a general rule, the different officers of the United States government, scattered in different parts of the country, are required to pay the same rate as are other customers of the same class.² However, in a case before the Supreme Court concerning gas rates in the District of Columbia, Mr. Justice Holmes rendering the opinion of the court, the following ruling was made:

We do not wish to belittle the claim of a taker to what for the time has become pretty nearly a necessity to equal treatment while gas is furnished to the public. But the notion that the Government cannot make as a condition of allowing the establishment of a gas works that its needs and the needs of its instrument, the District, shall be satisfied at any price it may fix, strikes us as needing no answer. The plaintiffs are under no legal obligation to take gas, nor is the Government bound to allow it to be furnished. If they choose to take it, the plaintiffs

¹ *Eiseman v. Rupert E. Co. (Idaho)*, P.U.R. 1919A, 552; *Wisconsin Tel. Co. (Wis. 1937)*, 16 P.U.R. (N.S.) 117; *Re Wisconsin-Michigan P. Co. (Wis. 1937)*, 16 P.U.R. (N.S.) 263.

² *Re New York, N. H. & H. R. Co. (R.I.)*, P.U.R. 1915E, 963; *New Bedford Gas & Edison E. L. Co. (Mass.)*, P.U.R. 1933D, 433.

must submit to such enhancement of price, if any, as is assignable to the Government's demands. We do not consider whether the commission has power to raise the price to the excepted class because, even if it has, the plaintiffs have no right to require equality with the Government, and they have no other ground upon which to found their supposed right.—*Hollis v. Kootz*, 255 U.S. 452, 65 L. ed. 727, 41 Sup. Ct. 371, P.U.R. 1921C, 637.

Some decisions are contrary to this ruling, as shown in the following:

"Rates for water furnished to a United States Government military reservation at 6 cents per thousand gallons were declared unreasonable and discriminatory, where it appeared that the expense of the service apportioned according to the number of gallons pumped for sale amounted to 8 cents per thousand gallons, and where if additional revenue, which the company claimed as necessary to put the property on a paying basis, was taken into consideration, the cost of supplying water actually sold would be more than 12 cents per thousand gallons." *Leavenworth v. Leavenworth City, Ft. Leavenworth Water Co. (Kan.)*, P.U.R. 1915B, 611. "Suits by the commanding officers of local United States Army posts for a flat 10 per cent reduction in rates for various utility services to such posts were dismissed as attempts to secure preferential reductions, where the basis of the application was not supported by any other reason than the command of the applicant's superior officers that such suits be brought." *Re Kansas City P. & L. Co. (Mo. 1934)*, 2 P.U.R. (N.S.) 372.

In general, it is illegal to grant special concessions in rates to state governments, counties, and cities. This ruling applies to utilities supplying gas, electric, telephone, and other service. In the case of railroads, special rates have sometimes been approved for the transportation of feed and persons connected with state institutions, when the work of those institutions was educational in nature. Whether or not a private utility operating in a particular community is justified in granting special rates to the municipality for services required by it hinges somewhat upon the practice followed by cities operating their own municipally owned utilities. Generally, municipal plants are operated by the citizens themselves in such manner as they see fit, unless restricted by statutory provisions. In such instances, neighboring municipalities in which private utilities operate will demand similar consideration, and, unless the claims are entirely

unreasonable, there does not appear to be any great harm in granting these privileges. Therefore, whether such discriminatory practice by private utilities is permitted depends upon opinion molded by the practices in municipalities owning their own systems in the same general area.¹

"The result of furnishing street lighting free must be either to make the cost of such service fall on the consumers who thus pay for it in the way of unreasonably high rates, or else it must come from the profits of the company and thus from the stockholders." *Weaver v. Kirkville L. P. & Ice Co.*, 1 Mo. P.S.C.R. 564. "Special rates by a railroad for piers owned by the state constitute discrimination. There is no justification in the view that the ownership of the pier by the Commonwealth and the large public interest involved, made it just and reasonable that the shipments from that pier should receive a more favorable rate." *National Dry Dock and Storage Warehouse Co. v. East Boston*, 2 Mass. P.S.C.R. 163. "A commission order authorizing the discontinuance of free hydrants and water therefor for fire protection purposes and establishing a rate to be charged was sustained by the Oregon supreme court." *Hillsboro v. Public Service Comm.*, 97 Ore. 320, 187 Pac. 617, P.U.R. 1920C, 817.

Just as it is discriminatory to charge a governmental unit less than any other customer, it is discriminatory to sell to employees of such a unit at a lesser rate than to others of the same class.

"County officers should be charged the same rate as other business patrons." *Re Telephone Rulings*, 1 Kan. P.U.C.R. 114. "All free and reduced rate telephone service to officers in various municipalities was forbidden by a conference ruling of the Illinois Public Utility Commission." *Re Tampico Farmers Mutual Tel. Co. (Ill.)*, P.U.R. 1915A, 24.

As in the case of private corporations, so in the case of municipally owned utilities, free service should not be rendered for city purposes. The fallacious argument is advanced that the citizens

¹ *Re Interstate Public Service Co. (Ind.)*, P.U.R. 1919A, 686; *Re Home T. & T. Co. (Ind.)*, P.U.R. 1922E, 481; *Re Chicago, B. & Q. R. Co. (Neb.)*, P.U.R. 1916C, 104; *Re Telephone Co.*, 19 Fla. R.C.R. 23; *University of Montana v. Bozeman (Mont.)*, P.U.R. 1924A, 705; *Apple v. Brazil (Ind.)*, P.U.R. 1915C, 561; *Re Telephone Rulings*, 1 Kan. P.U.C. 114; *Mountain States T. & T. Co. v. City of Great Falls (Mont.)*, P.U.R. 1927A, 30; *Re Lexington Water Co. (Ky.)*, P.U.R. 1928E, 323; *Billings v. Pub. Service Comm.*, 67 Mont. 29, 214 Pac. 608, P.U.R. 1923E, 77; *Re Clarksburg L. H. & P. Co. (W. Va.)*, P.U.R. 1928B, 293; *Re Leadville Water Co. (Colo.)*, P.U.R. 1931E, 26; *Re West Coast P. Co. (Wash. 1934)*, 5 P.U.R. (N.S.) 204.

are the ones who own the plant and who receive the service. It makes no difference whether they pay for the service to the city itself in the form of taxes or in the form of additions to their rates. It has been shown that the cost of the free service to the city plant is often greater than the saving in taxes they would pay into the city treasury. The amount of extra charge in the bills of those taking regular service can bear no direct ratio to the proper tax that a person should pay to the city if the service is paid for by the city. Some who own property in the city do not use any service, and these escape paying anything for the tax. The proper plan is to make a fair charge for such service to be paid to the utility by the city and then to collect a tax from the municipally owned plant in the same amount and manner as if it were privately owned.¹

It is usual to grant free transportation on street railways to policemen and firemen while on duty. However, such officials when off duty should pay the regular fares. Free telephone service and free gas and electric service to city officials are illegal and discriminatory. It makes no difference whether the recipient of such service is an employee of the company, the city, the county or a private individual, the same charges should be made for the service.²

Before the establishment of regulatory commissions, the utility in seeking franchises often agreed to supply free service for certain municipal undertakings and for other requirements at rates lower than those available to the other customers. These concessions were considered to be in the nature of a price paid for the privilege of doing business in the community. Whether or not this practice is discriminatory and should be prohibited depends largely upon the statutory provisions in the particular state in which the municipality is located. In some instances, commissions have declared such franchise provisions nonopera-

¹ *Re Warren (Ind.)*, P.U.R. 1919A, 190; *Re Hammond Waterworks (Ind.)*, P.U.R. 1927A, 443; *Cavanaugh v. Whitefish Municipal Waterworks (Mont.)*, P.U.R. 1922E, 198; *Spangler v. Great Falls (Mont.)*, P.U.R. 1927E, 274; *Re Sheboygan Water Dept. (Wis.)*, P.U.R. 1931E, 250; *Re Billings Gas Co. (Mont. 1934)*, 1 P.U.R. (N.S.) 259.

² *Re Administrative Ruling No. 1*, 1. Colo. P.U.C. 33, 47; *Tempe v. Mountain States T. & T. Co. (Ariz.)*, P.U.R. 1915D, 716; *Re Tampico Farmers Mutual Tel. Co. (Ill.)*, P.U.R. 1915A, 24; *Libby v. Libby Water & E. Co. (Mont.)*, P.U.R. 1922E, 402.

tive and have placed a value on the franchise equivalent to the capitalized value of free service rendered. No general statement can be made concerning these situations, for the practices permitted are subject to different laws in different states as well as in comparison with cities operating their own municipal plants in the same territory.¹

"Where free or reduced rates were provided for service to a city under a franchise, it was held that there was at least no presumption that the franchise was without monetary value." *State v. Peninsular Tel. Co.*, 73 Fla. 913, 75 So. 201, P.U.R. 1917E, 453. "It is one thing to provide a service without charge when the utility bargains with a body politic for a franchise; it is a radically different thing for a utility duly enfranchised to sell to the public generally. In the one case the utility buys particular privileges from a particular body politic; in the other case, the utility sells services to consumers generally. In one case it buys a franchise; in the other it sells a service." *Plainfield v. Public Service E. Co.*, 2 N.J. P.U.C. 475.

During the past several years, i.e., since the inauguration of the Rural Electrification Administration, special consideration has been given by utilities and commissions to the establishment of low rates for the supply of power to co-operatives organized for the distribution of electricity to rural areas. Many arguments have been advanced by persons interested in bringing electricity to the farmers that utilities should place this type of business in a special classification and should sell energy at a low figure to the co-operative associations for resale to their membership; the plea being that unless this classification can be made the co-operatives will not be able to become going concerns, paying their operating expenses and fixed charges on the money borrowed from the government for the purpose of constructing electric lines. On the other hand, others have stated that such business is similar to resale business and to give such co-operatives a lower rate than municipalities or private companies using energy for resale purposes is discrimination.

Some commissions and companies have looked upon the problem in a broader way, realizing full well that this venture

¹ Re Midwest P. Co. (N.D.), P.U.R. 1923E, 816; Hillsboro v. Public Service Comm., 97 Ore. 320, 187 Pac. 817, P.U.R. 1920C, 817; Re Dixie P. Co. (Utah), P.U.R. 1922B, 832; Monroe v. Monroe Water Co. (Wash.), P.U.R. 1920E, 444.

is a social one. In the beginning, when customers are few and the use of electricity is small, no one is damaged appreciably, if at all, by any special consideration that may be given to build up this business. That the bringing of electricity to the farmer is a desirable end in itself no one will deny. Whether or not the citizens of urban centers should be asked to contribute indirectly toward this end is not yet answered. In fact, some advocate a subsidy for this purpose so that all citizens over a state or nation will bear a share in this special venture. A number of the commissions have justified special rates for such co-operatives by stating that they are nonprofit organizations, that the characteristics of the load are unknown and may be different from existing resale business both as regards load factor and time of occurrence of peak load, that the effect on adjacent urban communities may be different because of the advantages brought to farmers by electric service, etc. This opinion is illustrated in the following citation taken from an order issued by the Kentucky Commission:

Rural non-profit electrification co-operative associations constitute a distinct and reasonable classification of service for which a special classification and rate may be ordered without creating unreasonable or illegal discrimination, in view of the enthusiasm of these organizations and their active load-building programs, making it likely that their service will develop characteristics substantially dissimilar, particularly in diversity with existing loads, from any other class of electric business, and in view of the recognition which must be given to the non-profit government-sponsored nature of the business and the vast social benefits which will follow from improved living conditions on the farms. A special classification and rate for service to rural electrification co-operatives in a position to supply themselves, where the rate will cover the out-of-pocket costs of rendering service with a margin for contribution to general overheads and fixed charges, is justified under the rule that competitive conditions justify rate differences between utility customers.—*Re Wholesale Rates for Electric Power to Rural Co-operative Associations* (Ky. 1937), 19 P.U.R. (N.S.) 22.

It seems to the authors that the most reasonable approach to this problem is to consider it as in the same category as an experiment that might be made with an industrial customer who is performing a certain processing with other means of power or heat; in order for the utility and the customer to know what

advantages might accrue to each if such service could be performed by electrical power, they are justified in selling energy for such experiments for a short time at a low or incremental rate. Co-operative associations belong somewhat in the same classification, for at the present time it is not known what the average use per customer will be in the future, how rapidly the load will increase, and what the future economic status of the farmer will be. For an initial period of one or more years, therefore, it does not appear that the granting of a low rate to such co-operatives is discriminatory to the point where other resale customers are injured thereby. In fact, it appears to the authors that it would be extremely difficult for any community or resale customer to claim damages because of such action on the part of the utility and to back up this claim with figures that could not be disputed.

Welfare, Educational, and Social Organizations.—It has long been the practice of railroads to grant lower fares to persons engaged in religious and certain classes of welfare work. In all cases the work done by such individuals must be nonproft-making and entirely separated from commercial enterprises. As a result of this procedure, it has been the custom to ask special rates from other utilities for such classes of customers. Some of these allowances have been approved, and others have been condemned by the courts and commissions. Such rates have been condemned by both the Federal court and the Wisconsin Commission, the latter for a municipally owned plant.¹ For organizations operated without profit, such reductions have been approved in many other cases. These include free or reduced-rate telephone service in Massachusetts, reduced-rate gas service to a Good Samaritan Home in Maine, low-rate or free transportation in Maine and Colorado, and reduced gas rates in Wyoming.²

¹ Idaho P. Co. v. Thompson, 19 F. (2d) 547, P.U.R. 1927D, 388; Re Ladysmith Municipal Waterworks (Wis.), P.U.R. 1916E, 617.

² Re Free or Reduced Rates for Telephone Service (Mass.), P.U.R. 1917F, 587; Re Bangor Gas L. Co. (Me.), P.U.R. 1915A, 134; Re Dixon Water Co. (Ill.), P.U.R. 1921B, 553; Re Cheyenne L. Fuel & P. Co. (Wyo.), P.U.R. 1932A, 136; Re Billings Gas Co. (Mont. 1934), 1 P.U.R. (n.s.) 259; Re Dixon Water Co. (Ill.), P.U.R. 1929B, 403; Re Connersville (Ind.), P.U.R. 1922C, 482; Leavenworth v. Leavenworth City, Ft. Leavenworth Water Co. (Kan.), P.U.R. 1915B, 611; Re Wiscasset Water Co. (Me.), P.U.R. 1916D, 925; Re Leominster E. L. & P. Co. (1910), 25 Mass. Gas & E. L. Comm. 17; School Dist. v. St. Joseph R.L.H. & P. Co. (Mo.), P.U.R.

The granting of reduced rates to religious and charitable institutions is similar to the law and custom in most states which exempt certain charitable and nonprofit organizations from paying taxes. In the case of churches, in some states at least, no taxes are levied, so one might say that taxes on other real property are increased and citizens who are not church members are obliged to contribute to these churches in their taxes. Following the same line of reasoning, other users of electrical energy in a community would be paying a slightly higher price if churches and charitable institutions were given service free or at a low rate.

Hospitals are not always to be classed as charitable institutions. For this reason, a distinction has to be made in favor of charitable or benevolent institutions of this character. Public-health nurses engaged in tuberculosis work are classed under the head of receiving free or reduced transportation when on duty.¹

In some cases churches have been granted free or reduced rates for service;² in other cases such rates have been denied.³ Low telephone and railroad rates were allowed to clergymen in many cases.⁴

The practice of furnishing free service or service at reduced rates to public and parochial schools has been disapproved both for municipally and privately owned utilities in many states.⁵

1920A, 559; *Re Somerville Water Co. (N.J.)*, P.U.R. 1922C, 309; *Re West Virginia Water & E. Co. (W. Va.)*, P.U.R. 1920D, 409; *Smith v. City Water Co. (Wis.)*, P.U.R. 1916B, 1068; *Re Rumford Falls L. & Water Co. (Me.)*, P.U.R. 1915A, 616; *Guthrie Gas L. Fuel & Improvement Co. v. Board of Education (Okla. Sup. Ct.)*, P.U.R. 1917E, 200.

¹ *Re Anderson (Ind.)*, P.U.R. 1915E, 962; *Re Maine Central R. Co. (Me.)*, P.U.R. 1916C, 103; *Re Administrative Ruling No. 16*, 1 Colo. P.U.C. 48; *Department Pub. Works v. West Coast P. Co. (Wash. 1934)*, 5 P.U.R. (N.S.) 204; *Cochems v. Denver & R.G.R. Co. (Colo.)*, P.U.R. 1916A, 905; *Angola v. Indiana Util. Co. (Ind.)*, No. 9, Aug. 11, 1916; *Re Somerville Water Co. (N.J.)*, P.U.R. 1922C, 309.

² *Re Various Public Util.*, 2 Cal. R.C.R. 73; *Apple v. Brazil (Ind.)*, P.U.R. 1915C, 561.

³ *Re Warren (Ind.)*, P.U.R. 1919F, 38; *Botts v. Brookfield (Mo.)*, P.U.R. 1917D, 224; *Re Ladysmith Municipal Waterworks (Wis.)*, P.U.R. 1916E, 617.

⁴ *New York Tel. Co. v. Siegel-Cooper Co.*, 202 N.Y. 502, 96 N.E. 109.

⁵ *Re West Virginia Water & E. Co. (W. Va.)*, P.U.R. 1920D, 409; *Re Appleton (Wis.)*, P.U.R. 1915E, 960; *Re Elwood Water Co. (Ind.)*, P.U.R. 1920E, 269; *Re Wiscasset Water Co. (Me.)*, P.U.R. 1916D, 925.

Universities operated from state or private sources of income have also been refused special free service and have been granted only the rate applicable to the particular class of load that they furnish.¹ Reduced rates were granted to a public library in one case.² An agricultural demonstration train was operated free of cost to a college of agriculture.³

It has been the custom to allow lower rates, usually half fare, to school children when riding on street railways to and from school. This privilege has been abused in nearly every city where it has been put in force, for it is difficult for conductors to tell the age of children and whether they are really on their way to or from school or on some other errand. The amount of loss to the railways has been estimated to be immaterial, but the fact remains that extra cars must be operated during such rush-hour periods and other revenue-paying passengers are crowded out of their seats by these school children. This practice of granting half fares has been approved in several states, although there is doubt of its legality, whereas in other states or cities it has been denied.⁴

Lower railroad fares are usually granted to those attending state fairs and are justified because such fairs are considered to be educational. Such travel is on second-class tickets with limited service and brings in extra money to the railroads at the time of the fairs, both from passengers and from freight handled. In a similar manner, the Maine Commission allowed low fares to a Labor Day celebration, a Fourth of July celebration, a ball game, a football game, races, a political rally, and a convention. Low fares have been used by most railroads for those attending conventions, if more than a certain number of tickets are sold.⁵ Lower fares were authorized by the Maine Commission for such

¹ *University of Montana v. Bozeman* (Mont.), P.U.R. 1924A, 705.

² *Re Hebron Water Co. (Me.)*, P.U.R. 1932B, 247; *Re Rumford Falls L. & Water Co. (Me.)*, P.U.R. 1915A, 616.

³ *Chicago, B. & Q. R. Co. (Neb.)*, P.U.R. 1927A, 393.

⁴ *Bath State Ferry (Me.)*, P.U.R. 1921B, 363; *Butte v. Butte E. R. Co. (Mont.)*, P.U.R. 1921C, 857; *Re Boston & Me. R. Co. (N.H.)*, P.U.R. 1924E, 646; *Re Northwestern Pacific R. Co.*, 2 Cal. R.C.R. 910; *Beale v. San Francisco-Oakland Terminal R. Co. (Cal.)*, P.U.R. 1917A, 814.

⁵ *Iowa Dept. Agriculture v. Chicago, N.W.R. Co.*, 36 Iowa R.C. 26; *Missouri State Fair Board v. Atchison, T. & S.F.R. Co. (Mo.)*, P.U.R. 1920E, 754; *Re Maine Central R. Co. (Me.)*, P.U.R. 1915E, 951; P.U.R. 1916C, 103.

purposes as attendance at clubs, societies, and fraternal organizations, but they have been denied by other commissions.¹

In Favor of Contract Holders.—Discrimination sometimes exists between those holding contracts and those receiving service without contracts. Such discrimination is hard to guard against because a contract may be entered into between a utility and a customer who seems to be the only one of the class in the field. Later, new patrons come along with the same classification, but the contract drawn with the first consumer calls for exclusive service. Such preferential rates must give way to the new conditions, and all must be given the same treatment.

"Contracts for telephone service at less than the regular rates are void at common law and contrary to the public policy prevailing at the date of the Missouri anti-discrimination statute, because they are unjustly discriminatory." *Hannibal Trust Co. v. Southwestern Bell T. & T. Co. (Mo.)*, P.U.R. 1916E, 525. "Discriminatory rates cannot be justified by contracts entered into by a former management of the company." *Allen v. Boyertown E. Co. (Pa.)*, P.U.R. 1919C, 436. "Preferential rates under contracts which may not have been discriminatory when created but have become so under changing conditions must give way whenever the rate regulatory body prescribes just and reasonable general rates." *Re Mountain Water Service Co. (N.J.)*, P.U.R. 1928A, 287.

Preferential rates of any kind cannot be justified as against new customers.

"The commission has power to remove discrimination in irrigation rates by releasing old consumers who have defrayed pioneer expenses from the burden of lienbearing contracts and allowing them the advantages the same as new customers without contract." *Butte Canal Co. v. R. Comm. (Cal.)*, P.U.R. 1927E, 812. "An irrigation company may, without discrimination, carry out contract rates with the consumers who have paid an initial deposit, if a rate schedule is established that permits a prospective consumer to receive the same rate by paying an initial charge or paying a higher rate without such charge." *Nunn v. Sutter-Butte Canal Co. (Cal.)*, P.U.R. 1918E, 563.

As between contract and noncontract customers, any increase in rates caused by changing conditions or changed costs of opera-

¹ Re Maine Central R. Co. *supra*; *Corona v. Corona Home Tel. Co. (Cal.)*, P.U.R. 1915F, 1014; *Onondaga Golf & Country Club v. Syracuse S.R. Co.*, 96 Misc. 213, 160 N.Y. Supp. 693, P.U.R. 1916F, 540.

tion must apply in the same way to both regardless of the contracts.¹ "Increased costs in utility service from changed conditions should be distributed proportionately and equitably among all users of service irrespective of contracts." *Patterson v. Hughes E. Co. (N.D.)*, P.U.R. 1921A, 1; *Re Red River P. Co. (N.D.)*, P.U.R. 1923E, 534.

All contract rates that are in conflict with filed tariffs should be done away with. However, it sometimes happens that a rate is put in force under a contract with consumers who furnish a deposit toward the construction of the service or some other compensation is paid to the utility at the time of signing the contract. Such special payments must be taken into account, and the original customers with contracts must be reimbursed for their equities before putting them on the same rate with other customers, or else some monetary value must be placed on the contract to offset any difference in charges.

The New York Commission in order to eliminate any discrimination which might result against any utility customer, or class of locality, by reason of a contract, ordered gas and electric companies to do away with all special contracts which are at variance with filed tariffs, so that no consumer shall receive service under a rate which is not applicable to all customers receiving service under the same conditions.—*Re Special Contracts by Gas & Electric Companies (N.Y.)*, P.U.R. 1931E, 302.

Municipalities are frequently given special contracts for electric or water service at the time of granting franchises. These may be in the nature of installment payments for hydrants and connections which will pay for these items at the end of the term of years, or they may be in the nature of a franchise payment, giving the franchise a value. In general, special contracts with patrons are not approved by commissions when they are entered into before the enactment of laws creating the commissions.²

¹ *Coggeshall Launch & Towboat Co. v. Cousins Launch & Lighter Co. (Cal.)*, P.U.R. 1928D, 591; *Allen v. Boyertown E. Co. (Pa.)*, *supra*; *Taylor v. Northwestern Water Co. (Idaho)*, P.U.R. 1916A, 372; *Salisbury & Spencer R. Co. v. Southern P. Co.*, 180 N.C. 422, 105 S.E. 28, P.U.R. 1921B, 774.

² *National Dry Dock and Storage Warehouse Co. v. Boston & Albany R. Co.*, 2 Mass. P.S.C. 163; *Cauffel v. Johnstown Water Co. (Pa.)*, P.U.R. 1922D, 35; *United Fuel Gas Co. v. Public Service Comm.*, 73 W. Va. 571, 90 S.E. 931; *Re Special Contracts by Gas & Electric Companies (N.Y.)*, P.U.R. 1931E, 302.

A city's contract for fire protection as a specified rental, with a provision for free service after 20 years, is not invalid at common law as an unlawful discrimination in providing free service, since the city, in effect, pays the entire hydrant rental in 20 installments, besides the reason that free service to the public is not unreasonable or unlawfully discriminatory.—*Belfast v. Belfast Water Co.*, 115 Me. 234, 98 Atl. 738, L.R.A. 1917B, 908, P.U.R. 1917A, 313.

Mutual telephone companies and some municipally owned utilities require their stockholders and other customers to purchase and own their equipment and perhaps part of the line used in serving them. Sometimes, also, a rural electric line is purchased after construction by the original owners or is taken over by the utility without payment to the original owners. These groups receive service at the same rates as those charged for like service to others connected to the same system. Unless this equipment is paid for by the utility, there is discrimination against these customers in favor of those who do not own their equipment. Commissions usually require the utility to purchase such equipment from the customers so as to make the entire service nondiscriminatory.¹

"A telephone company may give reduced rates to former stockholder subscribers who are obliged to maintain their own lines." *Re Farmers Mutual Tel. Co. (Neb.)*, P.U.R. 1927A, 394. "Special reduced rates to telephone subscribers on a certain line so situated that the service is less valuable to them than to the other patrons were said to be discriminatory." *Re Arkansas Tel. Co. (Wis.)*, P.U.R. 1929E, 241. "Although the commission, under a statute prohibiting a utility from charging different rates to customers whose meters are furnished by the utility may in some cases permit the utility to pay customers owning their own meters a reasonable rental charge therefor, it will not authorize the charging of a meter rental against customers not owning such equipment." *Re Kenosha Municipal Water Dept. (Wis.)*, P.U.R. 1931A, 481.

Industrial and Commercial Consumers.—The custom has arisen of granting lower rates to consumers who use large quan-

¹ *Arena & Ridgeway Tel. Co. (Wis.)*, P.U.R. 1927D, 196; *Geneseo Co-operative Tel. Co. (Ill.)*, P.U.R. 1930A, 439; *Re Carlisle Co-operative Tel. Co. (Ind.)*, P.U.R. 1915D, 774; *Re Bruce Water & L. Comm'rs*, 9 Wis. R.C.R. 474; *Re Farmers Independent Tel. Co. (Neb.)*, P.U.R. 1919D, 769; *Re City of Fulton (Mo.)*, P.U.R. 1930D, 1; *Re Raymond Tel. Co. (Cal.)*, P.U.R. 1927D, 588.

tities of service. When these consumers form a class by themselves with load characteristics that are beneficial to the other consumers of the utility, such low rates are justified, for the additional load on the system lowers the cost of service to all other customers. However, care must be taken that this large-quantity service pays for the cost of rendering and does not throw an additional cost on the other consumers. Such differentials are not to be justified merely by the size of the customer's bill; they should not be allowed except where the business is not otherwise obtainable; they should be uniform to all persons for like service; the price should not be unreasonably low; and the rates should always be high enough to avoid a loss to the company.¹

"The practice of a municipal utility of allowing rebates to business places using more than a specified amount of current for lighting each month through meters is discriminatory." *Skogmo v. River Falls (Wis.)*, P.U.R. 1917E, 964. "An electric utility is justified in offering a low rate to secure a large consumer, who would not be obtained otherwise, provided such rate is sufficiently high to pay the output costs, as this will reduce the amount of fixed charges to be paid by the other consumers." *Re Coleman Pound L. & P. Co. (Wis.)*, P.U.R. 1920A, 105. "The granting of a low rate to a large consumer of gas is not discriminatory as against a domestic consumer, where the minimum bill is such that large consumers must use at least 10 times as much gas as the average domestic patron, but such patron should stand a larger proportion of a necessary increase in rates due to added manufacturing costs." *Re Modesto Gas Co. (Cal.)*, P.U.R. 1920B, 920. "The fact that under a rate schedule a small commercial consumer must pay an amount which produces an average cost per kilowatt-hour greater than to domestic consumers does not show discrimination where the cost of serving small commercial consumers is greater than that of serving domestic consumers using approximately equal quantities." *Re Hartford E. L. Co. (Conn. 1935)*, 9 P.U.R. (n.s.) 228. "A special contract giving reduced rates to a steel mill cannot be sustained on the ground that the consumer was a pioneer user of electricity in its business, that its successful operation would be of advertising value to the utility, and that it assumed

¹ *Re Leominster E. L. & P. Co.*, 25 Mass. Gas & E. L. Comm. 17, P.U.R. 1915E, 690; *Re Southside Waterworks Co. (W. Va.)*, P.U.R. 1920D, 752; *Re Public Service Co. of Colo. (Colo.)*, P.U.R. 1929D, 342; *Re Escanaba Traction Co. (Mich.)*, P.U.R. 1925B, 679; *Re East St. Louis & Suburban Water Co. (Ill.)*, P.U.R. 1928A, 57; *Clarksburg L. & H. Co. v. Public Service Comm.*, 84 W. Va. 638, 100 S.E. 551.

the risk and hazard of interruptions in transmitting the current over a 40-mile transmission line, since these are not the distinguishing conditions and circumstances which justify a rate differential." *Apollo Steel Co. v. West Penn P. Co. (Pa.)*, P.U.R. 1921D, 834.

Two general classes of consumer come under the head of combined billing: those who take their service through one meter for service used in several buildings, and those who have service rendered at a number of locations and desire to have the readings of these meters combined and one bill rendered by applying the schedule of charges to the entire consumption. A number of school buildings in a city is an instance of this second class, for the entire bill for all schools is paid by the same school board. In such cases each school is a separate customer with a load peculiar to itself. Combining the billings would deprive the utility of the amount collected on the initial blocks of the rate schedule, and the result would be discrimination against other consumers in the same class.

"It is an open question whether a school committee is, according to the common acceptance of the term, a 'large consumer' of electricity. It is true that the aggregate amount consumed by all the buildings under the committee's care is large, the buildings are widely separated, and are, and must necessarily be, independently supplied. It would hardly be claimed that a private owner of similarly located buildings is entitled to different treatment solely because the aggregate of all his bills is large." *Re Boston School Committee Correspondence*, 25 Mass. Gas & E. L.Comm'r's 22. "It is discriminatory for an organized school district to add the electric bills of its various buildings together so as to give it the benefit of the entire consumption as for a single installation." *School Dist. of St. Joseph v. St. Joseph L. H. & P. Co. (Mo.)*, P.U.R. 1920A, 539.

A similar question arises when an industry has plants situated in several parts of the same territory or city and is served by the same utility. If these plants were served by separate utilities, there would be no question of combining the billings; nor would there be if the bills were paid by separate customers. However, if there are two or more meters used to measure the load of a given customer for the convenience of the utility, then these meter readings should be combined. Of the first class, there can be no doubt as to the fairness of combining the readings for a single charge except possibly in the case of apartment houses with

separate residence customers, where the service is resold to these customers by the owner of the apartment. This latter case will be taken up under resale companies.¹

It has been the custom in some communities to make special concessions of no taxes and lower industrial rates for a short period in order to attract industries to a community. Such industries do build up the residence and commercial loads of the utilities, and sometimes the load taken by such a customer helps in lowering the cost of service to others in the residence and commercial classes. The opinions of commissions seem to differ concerning such low rates. Strangely enough, this practice is frowned upon more when coming from plants municipally owned than when privately owned. Of course, a rate so low as to place an undue burden on other customers is disapproved.²

"A municipal plant cannot lawfully furnish free service to industries for the purpose of attracting them to the city." *Re Hammond Waterworks (Ind.)*, P.U.R. 1919A, 180. "Contract rates for natural gas supplied to industrial users in large quantities were not disturbed, in view of the fact that the contracts were not shown to be burdensome to the public and that the industries had been induced to locate in it because of favorable fuel conditions and were vital to the life of the town." *Re American Indian Oil & Gas Co. (Okla.)*, P.U.R. 1924E, 114. "An agreement of a city, not having power to donate money or property to industries, to furnish free water to an industry for a term of years as a location inducement, cannot be sustained." *American Aniline Products, Inc. v. City of Lock Haven (Pa.)*, P.U.R. 1927D, 112. "A utility selling water to manufacturers using large quantities at a rate lower than that necessary to produce a full return on the investment, in order to promote business by influencing such manufacturers to locate in their district, thereby bringing in other classes of customers paying for water at higher rates, is not discriminatory where it does not appear that the rate is oppressive to other classes of consumers." *Maplewood Laundry v. St. Louis County Water Co. (Mo.)*, P.U.R. 1929E, 129.

A utility should not be permitted to make charges for service rendered on the basis of the use to which the service is to be put

¹ *Re New York Edison Co. (N.Y. 1935)*, 10 P.U.R. (N.S.) 244; *Viscose Co. v. Lewiston-Reedsville Water Co. (Pa. 1936)*, 13 P.U.R. (N.S.) 48; *25 Residence Customers v. Brooklyn Edison Co. (N.Y. 1937)*, 18 P.U.R. (N.S.) 241.

² *Re Osage & Oklahoma Co. (Okla.)*, P.U.R. 1917D, 426; *Re Water Comm. of Wausau (Wis.)*, P.U.R. 1928D, 820.

rather than of the amount and type of service rendered. Sometimes the type of business in which the customer is engaged helps to place that customer in a given rate class; but all others doing the same business and having the same type of load must receive the same classification, and this must be the classification of the load rather than of the business.¹

"Distinctions in classes of consumers resulting in different charges for a commodity furnished by a public utility must be based upon the quality of the article demanded and the amount of service rendered to supply the same, and not upon the profession or occupation of the consumer." *Garner v. Tulsa Ice Co. (Okla.)*, P.U.R. 1917C, 613. "A special rate based upon the mere fact that the users are manufacturers is held to discriminate against users of like quantities under similar circumstances, and it is immaterial that the purpose of such charge is to encourage manufacturing enterprises." *Hines v. Joplin Waterworks Co. (Mo.)*, P.U.R. 1920B, 943.

Resale customers are considered under two general classes. The first class consists of the distributing companies that sell gas or electric service in one or more communities, purchasing their requirements wholesale from some generating company; the second class is composed of office building and apartment-house operators (who may or may not be the owners) who purchase gas or electricity wholesale and then resell it to their own tenants. The first of these classes falls into the category of public utilities, and the rates charged are subject to regulatory laws. The company supplying the commodity (gas or electricity) may or may not be under the regulatory jurisdiction for the wholesale business, and rates for such service are then arrived at by bargaining between the buyer and the seller. However, after such rates have been mutually arrived at and contracts consummated, commissions reserve the right to alter the rates and determine the proper charge made for such transmitting companies within

¹ *Murphy Water L. & Ice Co. (Cal.)*, P.U.R. 1916B, 719; *Re Greeley Gas & Fuel Co. (Colo.)*, P.U.R. 1932C, 257; *Re Eastern Oregon L. & P. Co. (Ore.)*, P.U.R. 1915E, 960; *Model Laundry Co. v. East St. Louis & Suburban Water Co. (Ill.)*, P.U.R. 1918D, 132; *State ex rel. Moose v. Frank*, 114 Ark. 47, 169 S.W. 333; *Meier v. Samuels*, 110 Ky. 605, 62 S.W. 481; *Downing v. Lewis*, 56 Neb. 386, 76 N.W. 900; *Re White Star Laundry Co.*, 117 Fed. 570; *Commonwealth v. Keystone Laundry Co.*, 203 Pa. 289, 52 Atl. 326; *White v. Bell Tel. Co. (Pa. 1937)*, 17 P.U.R. (N.S.) 276.

the state, whether or not they are intercorporately related to the distributing companies. The case of apartment-house owners is not universally held either for or against such practice. However, when such practice is fixed in a given city or state, it should be universally held in all cases in the same jurisdiction.¹

"An order providing a regulation which prohibits the submetering of electric current for resale by a customer does not result in discrimination because an owner of a building is permitted to buy electricity for the entire building provided he does not remeter such electricity for sale to tenants." *Re Potomac E. P. Co.*, P.U.R. 1929B, 600. "It is discriminatory and unfair for electric energy to be sold to a landlord to be redistributed by him as a separate commodity at rates fixed by him or his agents and recorded on meters under similar control." 67 *South Munn Incorp. v. Public Service E. & Gas Co. (N.J.)*, P.U.R. 1929A, 330.

The question sometimes arises as to whether professional patrons, such as physicians and lawyers, should pay the residence rate or the commercial rate for telephone service. When the telephone is located in a private office, there can be no question of the proper rate to be charged. However, when the telephone is located in the residence and not in the office of the subscriber, it is not easy to make the proper classification.² One case under this type was decided by the Pennsylvania Commission as follows:

Refusal of a telephone company to furnish service at the residence rate to a physiotherapist, regularly licensed and in the practice of electro-therapy, in an office located in her residence, is unreasonable and discriminatory when the company, under its filed tariff, furnishes such service at residence rates to physicians, surgeons, nurses, dentists, veterinary surgeons, osteopaths, chiropractors, and Christian Science practitioners.—*White v. Bell Tel. Co. of Pa. (Pa. 1936)*, 12 P.U.R. (N.S.) 212.

Discrimination by Particular Utilities. *Electric Rates.*—Special types of electric rates have been applied in order to build up the load of different utilities. Some of these rates are justified and

¹ *Vincennes v. Central States Gas Co. (Ind.)*, P.U.R. 1920F, 356; *Salisbury & Spencer R. Co. v. Southern P. Co.*, 179 N.C. 18, 101 S.E. 593, 12 A.L.R. 304, P.U.R. 1920C, 688; *Central Trust Co. v. Consumers L. H. & P. Co. (Kan.)*, 282 Fed. 680, P.U.R. 1923A, 548; *Freeport v. Nassau & S. L. Co. (N.Y.)*, P.U.R. 1924A, 97.

² *Cumberland T. & T. Co.*, 12 La. R.C.R. 122; *Bevier Tel. Co. (Mo.)*, P.U.R. 1917A, 899.

others should not be used, for the particular load can be served better at the rate fixed on the regular meter-rate schedule for that class of consumer. Among these rates are special space heating, water heating, and cooking rates for residence consumers. When space and water heating can be done during the off-peak periods, a special meter and switch are furnished, and a means is provided by the customer to store heat during off-peak periods to be used in peak periods. However, if any current is used for these purposes during the peak-load periods of the utility, it should be taken through the regular residence lighting meter and charged for at regular lighting rates. The cooking load is not strictly off-peak and is best served by a step in the regular residence schedule.¹ The Wisconsin Commission has stated that the minimum bill is more discriminatory than the service charge for electric energy for residence and commercial use. Under the service charge, the consumer pays for the cost to the company of being prepared to serve the customer whether he uses any energy or not. Under the "minimum-bill" type of charge, those using the maximum allowable energy under the charge usually do not pay their fair service cost. However, some states forbid by law the imposition of a service charge.²

In order to try out the effect of a new rate structure in a given class, optional rate schedules are sometimes provided for a short period. It has been declared that such schedules are not unduly discriminatory if all are permitted to make a choice among them. In one rate schedule the charge may be made on the room-area basis and in another on a higher step in the sliding scale of block rates for residence service.³ Where a customer has only a relatively small power load and it is not advisable to install separate watt-hour and demand meters in addition to the meter for the lighting load, a combined lighting and power schedule of rates

¹ *Devils Lake Steam Laundry v. Otter Tail P. Co.* (N.D.), P.U.R. 1928C, 83; *Re Kaukauna E. & Water Co.* (Wis.), P.U.R. 1929E, 491; *Re Idaho P. Co.* (Idaho), P.U.R. 1920F, 959; *Department Pub. Works v. Washington Water P. Co.* (Wash.), P.U.R. 1928A, 122.

² *Re New London* (Wis.), P.U.R. 1931E, 369; *Koerner v. Lake Superior Dist. P. Co.* (Wis. 1936), 13 P.U.R. (N.S.) 179; *Re Union E. L. & P. Co.* (Mo.), P.U.R. 1918E, 490; *Re Commonwealth Edison Co.* (Ill.), P.U.R. 1930D, 321.

³ *Spear & Co. v. Duquesne L. Co.*, 105 Pa. Super. 240, 161 Atl. 441, P.U.R. 1932D, 384.

may be applied to this class of load. This procedure is held to be nondiscriminatory as between customers having a strictly lighting load on the one hand and those having a strictly power load on the other.¹ A low rate for energy to a street railway as a single-power customer is not discriminatory if the rate is sufficient to cover the out-of-pocket cost of the service and may be applied to any other customer with a similar load.²

"An electric utility is justified in offering a low rate to secure a large consumer, who would not be obtained otherwise, provided such rate is sufficiently high to pay the output costs, as this will reduce the amount of fixed charges to be paid by the other consumers." *Re Coleman Pound L. & P. Co. (Wis.)*, P.U.R. 1920A, 105. "There is a limit beyond which a utility should not be allowed to go in making low rates to large consumers." *Re Public Service Co. of Colo. (Colo.)*, P.U.R. 1929D, 342.

Gas Rates.—The minimum charge for the use of gas must be so taken as to cover the cost of the gas allowed under that schedule and a portion of the overhead charge. A minimum charge that fails to cover the cost of the gas on the first step of any other rate schedules for other consumers constitutes discrimination in rates.³ The use of prepayment meters for gas service is expensive both to the company and to the consumer. Where there is no provision for collecting a minimum charge for gas used through such a meter or where the money for such a minimum charge is allowed to be put through the meter, this practice is held to be discriminatory.⁴ Rates for space heating of certain classes of buildings without a similar application to other consumers are held to be discriminatory. Special rates for space heating, controlled by an automatic device that prevents peaks of demand and serves to iron out inequalities of demand for other uses, are not discriminatory.⁵

¹ *Toner v. Martinsville Gas & E. Co. (Ind.)*, P.U.R. 1923E, 69; *Seaberg v. Raton Pub. Service Co. (N.M.)*, P.U.R. 1931E, 417.

² *Fresno Traction Co. v. San Joaquin L. & P. Co. (Cal.)*, P.U.R. 1917E, 253; *Cleveland & Eastern Transit Co. v. Public Util. Comm.*, 106 Ohio St. 210, 140 N.E. 139, P.U.R. 1923D, 853.

³ *Re Public Service E. & Gas Co. (N.J.)*, P.U.R. 1929E, 17; *Re City of Wauwatosa (Wis.)*, P.U.R. 1930A, 360.

⁴ *Re Georgia P. Co. (Ga.)*, P.U.R. 1929B, 309; *Seattle v. Seattle L. Co. (Wash.)*, P.U.R. 1918E, 728.

⁵ *Re Wasatch Gas Co. (Utah 1934)*, 2 P.U.R. (N.S.) 47; *Pennsylvania P. & L. Co. v. Public Service Comm.*, 128 Pa. Super. 195, 193 Atl. 427 (1937),

The rate is conditioned on the customer paying \$75 per annum for gas used in space heating only, whether the customer uses that amount of gas or not. Here the conditions are not the same, as the customer is required to guarantee the payment of \$75 for gas used for space heating in order to obtain the advantages of the rate. We think, however, the rate is objectionable and that the rate should be available to all persons using substantially the same amount of gas and who guaranteed a like return, whatever the use may be to which the gas is applied, with provision, if necessary, to insure a similar uniformity of use as that of customers having space heating requirements.—*Re Boston Consol. Gas Co. (Mass. 1936)*, 12 P.U.R. (N.S.) 113, 14 P.U.R. (N.S.) 433.

Heating Rates.—The metering of steam for heating and the fixing of a proper minimum charge have caused considerable discussion. When there is no charge for steam used and the charge for heating is based on the area of radiation in use, there is considerable waste of steam by the consumers who fail to regulate the amount being used. When hot water is furnished for heating, there is not any meter on the market to measure the use of the heat taken by the consumer. Rates for such service must be made on the basis of exposed area and the type of construction of the building. Such rates are liable to be discriminatory. Another type of discrimination in this field is caused by the improper allocation of the cost of the steam or heat in the hot water, unless this steam or hot water is furnished from a plant entirely separate from that furnishing electricity to other consumers. When the heat was furnished from a power plant using simple, noncondensing equipment, the allocation was not difficult to make, especially when the steam-heating load was only a relatively small part of the combined output of the station. When steam turbines with condensing equipment are used, there is little or no spare exhaust steam for heating, and it is necessary to "bleed" the steam turbine at the point where the steam pressure in the turbine is the pressure required for heating. In this case the allocation of expenses to electric generation and

19 P.U.R. (N.S.) 433; *Levy v. Atlanta Gas L. Co. (Ga.)*, P.U.R. 1931C, 24; *Harrison v. Westchester L. Co. (N.Y.)*, Case 6392, Dec. 2, 1932; *Re Alabama Util. Co. (Ala.)*, P.U.R. 1930E, 473; *Smith v. Birmingham Gas Co. (Ala.)*, P.U.R. 1932B, 241; *Re Central States Util. Co. (Mich.)*, P.U.R. 1927D, 809; *Re Portland Gas & Coke Co. (Ore. 1934)*, 2 P.U.R. (N.S.) 277.

steam heating is extremely difficult, and discrimination may result.¹

Street and Interurban Railways.—Where zone rates are used for street or interurban railway fares, it is difficult to fix the zone limits in such a way as not to cause discrimination. A city line may not be the proper limit if the suburban area is closely built up and is less distant from the center of the city than are other areas in other directions. When a zone limit is fixed, a passenger living just beyond such a zone is discriminated against, and he usually has to walk to the zone line to avoid paying an extra fare. In many cases this condition is obviated by allowing a short overhaul each side of the zone line.² Tickets and limited-time passes are sold to regular passengers on some railways to give these passengers an advantage over the occasional rider. Such practice is not discriminatory, in general, for the regular passengers bring in the regular income of the lines and the occasional passenger, who may cause peak loads at certain hours of the day, costs the street railway more than do these regular patrons.³ Transfers cost the railways a considerable amount in the extra stops and extra time of handling. In some cases the use of transfers has been discouraged by making a small extra charge to those using them.⁴ Various new experiments have been tried recently to build up and hold travel on lines of the railway against the competition of private automobiles and buses. Some of these experiments have been "Christmas shoppers' passes" at certain off-peak hours of the day, "children's free pass," "shoppers' hourly pass transfers," "summer night pleasure passes," and "free carriage of customers of particular commercial firms." These special fares or passes were declared not to be discriminatory.⁵

¹ Re Illinois P. & E. Corp. (Ill.), P.U.R. 1929A, 605; Re Wisconsin Minnesota L. & P. Co. (Wis.), P.U.R. 1919B, 318.

² Re United Railways & E. Co. (Md.), P.U.R. 1928C, 606; Philadelphia & West Chester Transit Co. v. Borth (Pa.), P.U.R. 1928D, 280; Re Blue Hill S. R. Co. (Mass.), P.U.R. 1915E, 370; Re Street Railway Fares (Mass.), P.U.R. 1920C, 228; Re Massachusetts N.W.S.R. Co. (N.H.), P.U.R. 1917A, 360; State ex rel. Pugh v. Public Service Comm. 321 Mo. 297, P.U.R. 1929B, 225.

³ Chicago Rapid Transit Co. (Ill.), P.U.R. 1928D, 675; Re Washington Route, Inc. (Wash.), P.U.R. 1932E, 66.

⁴ Milwaukee E. R. & L. Co. (Wis.), P.U.R. 1928E, 15; Joplin v. Southwestern Missouri R. Co. (Mo.), P.U.R. 1916E, 47.

⁵ Milwaukee E. R. & L. Co. (Wis.), P.U.R. 1931E, 289; Re United E. R. Co. (R.I.), P.U.R. 1932A, 490.

Telephone Rates.—A single listing in a telephone directory is made for each subscriber without extra charge. However, where special listing is required, as listing under professions and business affiliations, an extra charge must be made, or else there will be discrimination against other subscribers in the same class.¹ The establishment of zone charges is difficult to make in telephone rates. The city limits are not necessarily the proper limits of a zone where the area is closely built up outside the city and these subscribers have the same community of interest for business as do those within the city. The rate is usually lower in a small city than in a larger one, as discussed under rates for telephone service. However, where a small city is adjacent to a larger one, it is not proper to charge a lower rate in this smaller city, when the residents depend upon the larger one for commercial connections for business and professional lines. Neither can an extra-radius charge be applied uniformly in all cases without discrimination, although the distance between two points is a scale of easy application.²

During the World War all telephone companies were under the control of the Government and installation charges were required. Such charges are fair, particularly when a consumer continually moves and the cost of changing the location of his telephone is considerable each year. However, such charge for new subscribers is discriminatory as against old subscribers who have never had to make such payments. A charge of 25 cents per telephone is reasonable for equipping telephones of a P.B.X. board with dials when the system is changed to automatic.³

A discriminatory classification in favor of users of telephone service would be created by crediting calls of a number of individual lines to a P.B.X. board to a single individual line, or by averaging the calls of several individual lines in order to permit a particular subscriber to reach a minimum rate for excess messages quicker than he otherwise would.—*Re Springfield Republican (Mass.)*, P.U.R. 1927B, 701.

¹ Baldwin v. Chesapeake & Potomac Tel. Co. (Md.), P.U.R. 1928E, 529.

² Lincoln T. & T. Co. (Neb.), P.U.R. 1924B, 466; Farmer's Ass'n. v. Chesapeake & Potomac Tel. Co., 5 Md. P. S. C. 167; Re Door County Tel. Co. (Wis.), P.U.R. 1931D, 173; Re Arkansaw Tel. Co. (Wis.), P.U.R. 1929E, 241.

³ Public Service Comm. v. Southwestern Bell Tel. Co. (Mo.), P.U.R. 1931B, 280.

Higher rates must be charged for temporary users than those paid by regular subscribers. Professional subscribers should not be charged a lower rate than that paid by other commercial subscribers. Single-line subscribers should pay a higher rate than those receiving party-line service, and rural subscribers with metallic connection should pay a higher rate than those served over a single-line wire ground-return line.¹ Toll charges should be uniform to all for the same distance of call over a given toll line, and it is improper to grant some telephones free toll service and charge toll to others. When free toll service is granted in a given area, the cost of such service is borne by all whether they use toll connections or not.²

Water Rates.—When part of the consumers on the same system are supplied at flat rates and others through meters, there is discrimination between these classes of consumers, and all service should be supplied on a metered basis. Free fire-protection service or an equal charge to all residences within an area are discriminatory in favor of the large property against the smaller property. The practice of permitting several residence consumers to take water through a single meter is discriminatory in favor of these consumers as against those having a single meter for each family, unless the schedule is a "straight-line" rate with a minimum charge so small that all single-meter residences exceed it.³

Telegraph Rates.—Telegraph companies must treat all alike as to rates for similar service. One news agency must be granted the same rates as any other for news service or for leased-wire

¹ Re Walker Tel. Co. (Minn.), P.U.R. 1917A, 899; Re Fulton Tel. Co. (Ind.), P.U.R. 1919C, 854.

² Re Southern Cal. Tel. Co. (Cal.), P.U.R. 1925C, 627; Re Montezuma County Tel. Co. (Colo.), P.U.R. 1928A, 519; Re State Tel. Co. of Wisconsin (Wis.), P.U.R. 1928A, 249; Re Mountain States T. & T. Co. (Ariz.), P.U.R. 1917E, 248; Re Telephone Co. (S.D.), P.U.R. 1915A, 1032; Re Dakota Central Tel. Co. (S.D.), P.U.R. 1915D, 1054; Postal Teleg. Cable Co. v. Cumberland T. & T. Co., 177 Fed. 726.

³ Re Menasha Municipal Dept. (Wis.), P.U.R. 1929A, 49; Blytheville v. Blytheville Water Co. (Ark. 1936), 15 P.U.R. (N.S.) 177; Re New Hartford Water Co. (Conn.), P.U.R. 1930C, 22; Re Augusta Water Dist. (Me.), P.U.R. 1925B, 234; Re Linton (Ind.), P.U.R. 1921E, 295; Re Eastside Water Co. (Ariz.), P.U.R. 1933C, 137; Re Beaver Brook Water Co. (Pa. 1935), 7 P.U.R. (N.S.) 159; Herr v. Lancaster Suburban Water Co. (Pa. 1936), 14 P.U.R. (N.S.) 369.

service. Free service or lower rates cannot be granted. In regard to franked service, the Federal Communications Commission has made the following decision:

The Communications Commission has power to adopt regulations governing the issuance of telegraph franks. The Federal Communications Act of 1934 prohibits telegraph companies from rendering service free of charge to one person while it makes a charge for the same service to another person. The permission to issue franks to the officers, agents, and employees of other common carriers not subject to the Communications Act, and to their families, is specifically made subject to such rules as the Commission may prescribe, although the privilege of issuing franks for use of officers, agents, and employees of the communication carriers subject to the Act, and their families, is not in terms subjected to any regulation by the Commission. No franks should be issued by a telegraph company purporting to authorize any person to send messages, the published charges on which in the aggregate would exceed \$50 in any calendar year, nor should any person use or attempt to use in any calendar year any frank or franks issued by one carrier for the sending of messages, the aggregate charges of which at the published rate would exceed \$50 in any calendar year.—*Re Rules Governing the Issuance of Telegraph Franks* (Fed. C. C. 1935), 7 P.U.R. (N.S.) 225.

Railroad Rates.—Discrimination between cities or between shippers in intrastate shipments is under the control of the railroad commission in that particular state. However, in making its decisions, due regard must be had to the interstate rates for similar commodities in the particular district as fixed by the Interstate Commerce Commission and approved by the courts. Short- and long-haul rates across state lines on similar commodities must also be taken into account.¹ Any rebates granted one shipper in preference to another entitles the one not granted the rebate the right to recover damages for the difference in the charges.²

¹ State ex rel. Minnesota R. & Warehouse Comm. v. Northern Pacific R. Co. (Minn.), P.U.R. 1927B, 82; Atchison, T. & S.F.R. Co. v. State, 85 Okla. 233, 206 Pac. 236, P.U.R. 1922D, 450; Foster & Glassell v. Railroads Operating in Louisiana (La.), P.U.R. 1929A, 17; Doherty Co. v. Chicago, M. & St. P. R. Co. (Wis.), P.U.R. 1927D, 450.

² National Radiator Co. v. Pennsylvania R. Co. (N.J.), P.U.R. 1929A, 159.

Municipal Utilities.—The same rules should apply to discrimination in rates by utilities owned and operated by municipalities as to those privately owned. Free service to the municipality itself, to agents of the municipality such as schools, or to officers and employees of the municipality should be forbidden. Free service by a municipality to itself causes an undue burden in taxation on those who use the service and pay for its use in distinction to those other citizens who do not use the particular service. Such service should be paid for at the same rates fixed on cost of service as are paid by private users, and the utility should pay the city taxes on the property of the utility. In this manner a proper balance can be made and all may be charged alike without discrimination.¹ Justice Brantly, of Montana, in characterizing a municipally owned public utility operating wholly within the city limits, said:

When a city engages in operating a municipal plant under an authority granted by the general law, it acts in a proprietary or business capacity. In this behalf it stands upon the same footing as a private individual or a business corporation similarly situated.—*Milligan v. Miles City*, 51 Mont. 374, 153 Pac. 270.

Miscellaneous Utilities.—The same general rules as to rates for intrastate and interstate freight apply to motor trucks and other common carriers as apply to railroads. The interstate feature of these carriers has only recently been placed under the control of the Interstate Commerce Commission. For intrastate business, the state commissions have been given control of the rates. The competition of contract carriers (as distinguished from common carriers) of motor freight has been still more difficult to control, as such carriers are private and do not hold themselves out to carry for all alike. Some states have recently passed laws for the control of such traffic in competition with that of others in the same field and with the railroads.² Motorbus and auto-stage rates are likewise under the control of the Interstate Commerce Commission in so far as they carry interstate trans-

¹ *Re Hillis (Ind.)*, P.U.R. 1927A, 442; *American Aniline Products v. City of Lock Haven (Pa.)*, P.U.R. 1927D, 112; *Re Town of Hagerstown (Ind.)*, P.U.R. 1927D, 262; *Barnes Laundry Co. v. River Falls (Wis.)*, P.U.R. 1917E, 964; *Frazer v. City of Pueblo (Colo. 1935)*, 10 P.U.R. (N.S.) 337.

² *Motor Service Express v. Baker (Cal.)*, P.U.R. 1928C, 531; *Re Kellogg Express and Draying Co. (Cal. 1935)*, 10 P.U.R. (N.S.) 42.

portation and under the control of the states for intrastate transportation.¹ Taxicabs are under the control of the cities as to licensing and policing but may be under the control of the state commissions as to rates.² Ferry and sewerage rates are also under state control. In many cases, sewage-disposal systems have no special charges for residences and other buildings but instead receive their income from the general tax levy or from a surcharge on the water rates, where the water utility and sewage systems are owned by the municipality.³

¹ Re Hanchett (Cal.), P.U.R. 1922B, 705; Denver-Colorado Springs-Pueblo Motor Way v. Masterson (Colo.), P.U.R. 1930A, 327.

² City Cab Corp. v. Patrick (D.C.), P.U.R. 1932C, 1.

³ Key System Transit Co. (Cal.), P.U.R. 1928D, 615; Public Service Comm. ex rel. Brewster v. McPherson Bros. Co. (Wash.), P.U.R. 1916D, 720; Re Tonopah Sewer & Drainage Co. (Nev.), P.U.R. 1924A, 837.

CHAPTER XIX

DISCRIMINATION IN SERVICE

All consumers along a distributing system of a utility have equal rights to service independent of the question of rates. A utility serving a particular city or district must treat all customers alike within the region that is covered by the franchise or charter provisions. Provisions governing extensions into sparsely settled territory are usually included in such franchises, to save the utility from making long extensions for a very small amount of new business and thus indirectly throwing an excessive burden on customers already served.

"It is the duty of a telephone company to furnish adequate service facilities for the public without discrimination." *State ex rel. Milton v. Four Lakes Rural Tel. Co.*, 141 Minn. 124, 169 N.W. 480, P.U.R. 1919B, 247. "A corporation which has dedicated its property to public use cannot arbitrarily select the consumers whom it will serve." *Salisbury & S. R. Co. v. Southern P. Co.*, 179 N.C. 18, 101 S.E. 593, P.U.R. 1920C, 688. "The refusal of a wholesale pipe-line gas supply utility to extend service to a distribution system because it did not care to do business with a municipal corporation is arbitrary and discriminatory and such extension was required to be made." *City of Fulton v. Panhandle Eastern Pipe Line Co. (Mo.)*, P.U.R. 1933A, 256. "Sparsely settled districts have no right to an electric service which will, unreasonably burden congested areas." *Re Fox & Putnam & Parker-Young Co. (N.H.)*, P.U.R. 1929E, 403. "A municipal water utility is under a duty to consumers to supply the water impartially to all reasonably within the reach of its pipes and mains." *Merryman v. Mayor & City Council of Baltimore City (Md. Civ. App.)*, 138 Atl. 324, P.U.R. 1928B, 546.

Extensions.—Free extensions from existing systems must be made without charge by all utilities for reasonable distances to serve new customers. Beyond these free amounts or for customers outside the corporate limits of cities and villages, it is the usual practice to charge the excess cost above the free

allowance so as not to burden other consumers by the excessive costs of extensions to new customers. Just how great an amount this free allowance should be has been covered elsewhere; but after a definite policy has been adopted, it is incumbent to adhere to it.

"It is not equitable as between rural patrons of a municipal electric plant to build and furnish free of cost a line for service to some patrons and at the same time to require others to construct the line by which they are served and donate it to the utility." *Re Hagerstown (Ind.)*, P.U.R. 1927D, 262. "An electric utility was held to be not discriminatory against an individual by refusing to serve him except in conformity with the terms of its regularly filed schedule requiring a contribution as a prerequisite to receiving service from a line extension of the utility." *Re Ohio Pub. Service Co. (Ohio)*, P.U.R. 1933B, 446.

Connections, Equipment, and Meters.—Electrical distributing companies are usually required to furnish all primary lines, transformers, secondary lines, and service lines to the premises of the consumer as well as the meter. Where the service lines are excessively long (usually more than one span) or unusual difficulty is encountered in entering the property of the consumer, he may be required to bear a part of the expense.

A rule providing that an electric company would extend service at its own expense up to and including the service control switch to give service to kitchens containing an electric range and an electric refrigerator in individual dwellings throughout an apartment building was held to be unduly discriminatory in both form and substance. Such a rule effected a classification which was unreasonable. Although the commission recognized that only unreasonable discrimination was unlawful and that reasonable competition under proper conditions was lawful and should be encouraged, it was said that complaint between utilities was permitted to be met or carried on through rates or class of service open and available to all persons in the same circumstances and not be devices or schemes having the effect directly or indirectly of accomplishing rebates or granting bonuses or concessions. Concerning the question of classification the commission asked: "May the company limit the class entitled to contribution under the rule to those who install both electric ranges and electric refrigerators? Is there a reasonable reason for such classification? Should the company be permitted to provide and charge different rates as between its domestic customers using electricity for both range and refrigerator and those using it only for range or refrigerator? Would not such classification as between domestic

consumers be unreasonably discriminatory? And, if such discrimination cannot be legally accomplished directly, can it be indirectly through bonuses or installation contributions or concessions?"—*Re Potomac E. P. Co.* (D.C. 1937), 20 P.U.R. (N.S.) 367.

When customers request underground connection instead of overhead service, the extra cost of the underground connection over that for the overhead installation may be assessed against the customer. For gas and water connections, the pipe must be supplied free by the utility from the mains to the curb or property line in most communities, the service pipe from the curb to the building basement being furnished by the customer. The meter is usually located on the property of the consumer and is furnished by the utility. In case of locating the meter at the curb, provision must be made to prevent the meter from freezing. Telephone lines and service wires, as well as all instruments and protective devices on the customer's premises, are furnished by the telephone company. Telephone connections within the building of the subscriber are usually furnished by the telephone company.

"An electric utility cannot require agricultural power, oil-well power, and isolated lighting consumers to supply transformers, which are furnished free to mining power, industrial power, commercial lighting, and most residence lighting consumers." *East Bakersfield Improvement Ass'n v. San Joaquin L. & P. Co.* (Cal.), P.U.R. 1916C, 830. "An electric company may segregate seasonal customers from those taking service throughout the year and impose a proper charge on the former for the connection and disconnection of service." *Trier v. Eastern New Jersey P. Co.* (N.J.), P.U.R. 1929D, 166. "It is not discrimination for an electric company engaged in substituting alternating for direct current to certain city areas to refuse to take on any business in that location on direct-current basis where all new applicants for service are likewise required to take alternating service." *Shroder & Koppel v. New York Edison Co.* (N.Y.), P.U.R. 1929E, 257. "The policy of a water utility in making free service pipe installations and supplying meters to some customers and requiring others to pay for the service is discriminatory." *Louisiana v. Louisiana Water Co.* (Mo.), P.U.R. 1918B, 774. "The cost of installing an extra cable to supply current to a refrigerating plant in case of breakdown should be borne by the refrigerating company to avoid discrimination against other consumers." *St. Louis Refrigerating & Cold Storage Co. v. Union E. L. & P. Co.* (Mo.), P.U.R. 1921D, 518.

Shortage of Supply.—During a shortage of supply, a utility should treat all consumers alike in respect to service. An exception to this general rule occurs when lesser charges are made to one class of users because of the conditions that service will be curtailed to this class before it is to other classes who are paying a higher rate. In other words, the charges are closely related to the quality of the service, the point to be remembered being that customers paying on the same schedule are entitled to all that goes with that schedule.

"A natural gas company facing a shortage should not discontinue service to part of its customers, but should curtail service to all." *Re Peoples Gas Co. (Ind.)*, P.U.R. 1922E, 784. "In event of a gas shortage at any time, preference should be given to domestic consumers." *Re Osage & Oklahoma Co. (Okla.)*, P.U.R. 1917D, 426. "A water utility should dispose of its water under equitable rules with reference to priority application and in such amounts only as are actually needed at the time." *Re Murray (Cal.)*, P.U.R. 1917C, 521. "An irrigation company should not be allowed a preferential right to the use of water in times of shortage, although such preference may be required under the terms of a contract with its consumers." *Hancock v. East Side Canal Co. (Cal.)*, P.U.R. 1927C, 316. "A telephone company which has undertaken to furnish leased-wire service to certain customers, under filed tariffs and rules governing such service, unlawfully discriminates by refusing leased-wire service to an organization seeking to use the facilities for the transmission of radio music from a central producing point to hotels, restaurants, and other prospective customers, including private citizens, when the company has ample facilities for the present demand of the applicant." *Re New York Tel. Co. (N.Y.)*, P.U.R. 1932A, 262.

Numerous Utilities.—The Illinois Commission [*Re Commonwealth Edison Co. (Ill.)*, P.U.R. 1920B, 700] refused to approve the proposed rules of an electric utility which were designed to raise the power factor of the company's service and which required that future installations of motors of 100 hp or larger rated capacity should be of the synchronous type and that motors of 50 hp or larger, if operated at variable speeds or if normally started frequently, should be of the wound-rotor or slip-ring type. Consumers are entitled to a direct benefit for the additional expense of installing synchronous motors for the purpose of improving the power factor of an electric system. By adopting

a provision giving some adequate benefit to the customers who maintain good power factor, the discriminatory practice can be avoided.

"A corporation organized to sell hydro-electric power by contracting to sell power to distributing companies, and inducing them to scrap their facilities for generating power, was held to have dedicated its property to such use so that it could not discriminate between several members of the class desiring its service." *Salisbury & S. R. Co. v. Southern P. Co.*, 179 N.C. 18, 101 S.E. 595, P.U.R. 1922C, 688; 180 N.C. 422, 105 S.E. 28, P.U.R. 1921B, 774. "A telephone company was ordered to furnish messenger service without discrimination where non-subscribers were called for by patrons of the telephone company and the latter were willing to pay for such service." *Cavanaugh v. Chesterfield Tel. Co. (Ill.)*, P.U.R. 1915D, 228. "Operators of a telephone utility were forbidden to take private likes and dislikes into their business so as to work unjust discrimination against subscribers and others." *Re Goodman Tel. Co. (Mo.)*, P.U.R. 1932B, 384. "Unjust discrimination is not shown by the refusal of an electric utility to permit the installation of 50 horsepower slip-ring motors at an ice plant, in accordance with a rule filed with the commission, although certain exceptions to the rule may have been made when the rule was new and had not been brought to the attention of the parties installing motors." *Hydrox Co. v. Commonwealth Edison Co. (Ill.)*, P.U.R. 1924C, 342.

SECTION VI

RATES

CHAPTER XX

REGULATION OF RATES

In General.—Schedules of public-utility rates are decided upon or made effective for the purpose of determining in a definite manner the charges to be made for the service rendered by a utility to its customers. The utility must obtain from its charges a sufficient amount of money to enable it to pay its operating expenses, taxes, and interest on the fair value of its property and, in addition thereto, a sufficient amount to meet the depreciation incurred by its equipment in rendering the service. The determination of the schedules of rates that will accomplish this purpose, and this only, is the problem that the regulating body has to solve. In addition to these requirements, the law specifies that there must be no unlawful discrimination in charges made for like and contemporaneous service. This latter provision leads to the placing of customers in groups, usually referred to as "classification of customers," and requires that all customers falling within a certain classification are entitled to the same charge for the same amount of service received.

The reasons justifying a different rate schedule for each classification are often quite numerous; but they usually hinge upon the characteristics peculiar to the class, which may include (1) quality of service rendered, (2) hazards involved, (3) time when the service is used, (4) value of the service to the customer, (5) stability of the demand for the service by the customers from year to year, (6) quantity of service supplied in relation to the value of the property of the utility necessary to supply such service, and (7) other reasons. These conditions necessitate that each schedule of rates shall state the class of customers to

which it applies, the service or commodity that is to be delivered, the method of determining the charge (the rate schedule), and other items affecting its application.

Besides the schedules covering service to classes of customers, there are frequently special considerations outside any of those included in the classifications, which justify special rates, such as the sale of surplus or "dump" power in large blocks, rates for interchange of power between two utilities rendering service in adjacent territories, special rates and charges in consideration of breakdown service to be rendered in emergency, and temporary low rates to exist only during a developmental period.¹

Because utilities are usually given some prerogatives, public opinion, as exemplified by laws, demands that the charges for the utility service shall be fair and reasonable and that excessive return on the fair value of the property shall not be permitted. The charges allowed, therefore, should bring into the utility sufficient revenue to permit adequate and satisfactory service and a reasonable return on the fair value of the property, but no more. This minimum revenue is such that, if less were earned, the utility would be deprived of a portion of its property, which

¹ As an example of the last of these schedules, suppose that a municipal water plant is now pumping water by means of steam pumps and that it desires to change gradually to the use of electrically driven pumps for which energy is to be purchased. On the assumption that the requirements for water increase from year to year, the waterworks could install additional steam pumps, and the total operating cost, including fixed charges for such additional equipment, because of its incremental nature, might be less than the cost of purchased energy for this first small increment if the utility's standard schedules were applied. By making a special rate for this business, with the understanding that the waterworks will install electric pumps for all its future requirements and will replace all steam pumps with electrically driven pumps at some future date, the utility is assured of supplying all the energy required by the waterworks at that future time and so can perhaps supply energy at a low rate for a temporary period.

Also, there may be some particular kind of business whose development the utility is desirous of promoting; when fully developed, such business may have a demand for a considerable volume of energy and of such a nature as to fit in with the existing business of the utility in such a manner as to enable the utility to make use of its equipment in a more efficient manner. Under such circumstances, the utility might be justified in developing a schedule of charges, at present below cost, in order to develop this new class of business; the new load then lowering the present unit cost of developing energy below that charged the new business.

condition is in conflict with the Fourteenth Amendment of the Constitution of the United States.

In general lines of business, the selling price of commodities is determined largely by competition. To assume that utilities being monopolies are not subject to competition is erroneous. Instead of telephoning, one may send a messenger or send a letter by mail (including air mail). True, the service received is not the same but a substitute. One need not ride on a train to go to another city; one may ride in a bus or in a private automobile. For cooking, one need not use gas from the utility's pipes; one may use other fuels or electricity. A factory need not purchase its power; it can manufacture it.

The average citizen, because of the prerogatives granted to utilities, is entitled to purchase such utility service as he may need at a fair price, even though he has the privilege of using a substitute service, of obtaining the same service by some other means, or of denying himself the use of the service, as he may choose; and he may not be compelled by law to use the service. Hence, it follows that it is the price paid by the average citizen which is of major importance and to determine which much legislation has been enacted. Regulation, or the determining of fair charges, may be accomplished by (1) competition, (2) franchise contracts, (3) courts of equity, (4) city councils, (5) legislatures of states or commissions empowered by them, (6) Congress of the United States, or commissions created by it, (7) arbitration boards stipulated by contract between the parties, and (8) comparison of charges made elsewhere.

It is almost axiomatic that high charges spur human beings to devise substitutes or methods of obtaining the same service at a lower cost, which in itself should be and is a factor of considerable importance and one that utility executives do not ignore. In considering the problem as extending over a great many years, it appears that, regardless of regulating bodies and laws passed to prevent overcharging, such overcharging is but of a temporary nature and, finally, there can be no excessive charges regardless of the lack of regulation. Humanity is not static; changes are taking place continually, slowly in some cases, more rapidly in others; new discoveries are made; new developments using such discoveries come into being; the price level falls and rises with business cycles; and the effect of all these is such that over an

extended period the charges by utilities are more or less automatically regulated. It is the result of human activity and public opinion that finally decides the question of the fairness of all prices.

Power of the State to Regulate.—The United States of America is a union of self-governing states, held together by the Constitution which delegates certain specific powers to the Federal government and reserves to the states all powers not so delegated. If experience demonstrates that a change is desirable, such change can be accomplished through amendment of the Constitution. Each state has the power to pass and to enforce laws for the benefit of its citizens, which laws must not be contrary to the state constitution, itself an instrument created by and for the benefit of the citizens. Among the powers granted to the legislatures of the states is the power to create artificial persons in the form of corporations. Since a corporation is created by the state, it seems only natural that the state may impose such rules for its conduct as it deems necessary for the public welfare. Utilities are usually corporations, and this fact means that they can be regulated to a certain extent. Unless there exists some specific and important reason for perpetual existence, ordinary common sense dictates that privileges granted any person should not be for an unreasonable length of time. Hence, partial control can be accomplished through the corporation laws. Besides this method, the legislature can determine maximum prices to be charged for various services and commodities, provided that constitutional rights are not infringed thereby.

Some powers vested in legislatures of states by the people thereof, through their state constitutions, may be delegated by such legislatures to others. In granting to a city or village its charter, provision may be made conferring certain powers to the governing bodies of such municipal corporations. They in turn may specify that charges for utility service shall be included in franchises. Or the legislature may delegate the power of determining fair rates to a commission created for such express purpose.

Power of Courts to Fix Rates.—As a general rule, a court will not take upon itself the power and duty to fix specific rates. It will hear testimony as to possible confiscation of property of a utility due to certain rates fixed by a commission or by a municipi-

pality; but it will usually remand the case back to the body from which it originated for a new determination of rates based upon rules laid down by the court. The viewpoints of the courts regarding their functions are illustrated in the following citations:

"The fixing of rates is not a judicial function, and the right to review the conclusion of the legislature or Commission is limited to determining whether or not the legislature or Commission acted within the scope of its authority, or the order is without substantial foundation in the evidence, or a Constitutional right of the utility has been infringed upon by fixing rates which are confiscatory or insufficient to pay the cost of operating expenses and give the utility a reasonable return on a present value of its property." *State Pub. Util. Comm. ex. rel. Springfield v. Springfield Gas & E. Co. (Ill.)*, P.U.R. 1920C, 640, 291 Ill. 209, 125 N.E. 891.

"The courts will not relieve a utility from its obligations to serve at rates agreed in a valid contract entered into by it with a municipality, however inadequate such rates might be, as the enforcement of such rates is controlled by the obligation resulting from such contract. A contract between a city and a rapid transit company fixing a fare to be charged during the term of this agreement was held not to be subject to a subsequent regulatory provision of the Public Service Commission Law regarding rates, in view of the expressed intent of the legislature that the agreement so fixed between the parties should be free from subsequent regulation." *City of New York v. Interborough Rapid Transit Co.*, 240 N.Y. 316, P.U.R. 1930C, 144.

"A Federal district court in passing upon claims against a street railway company operating under a receivership has the power to fix the price to be paid by the receivers of the railway and an electric utility for wholesale power supply on a *quantum meruit* basis, where both utilities have abrogated the provisions of a rate contract for such service, where there is no legal published rate governing the amount to be charged and where the state Public Service Commission has never exercised any rate-fixing powers on the subject matter in controversy. A Federal court in determining the amount to be paid by a company in receivership for wholesale supply furnished after the abrogation of a rate contract between the parties is not exercising the power of rate making in a strict sense, but is determining only a fair value of the services rendered in a situation where it is necessary for the court to determine such question." *United R. & E. Co. of Baltimore*, 7 F. Supp. 265 (1934), 4 P.U.R. (N.S.) 142.

It is thus apparent that, when a commission decision is carried to a court, the questions to be decided may be any of the follow-

ing: (1) whether the commission law is in accord with the constitution; (2) whether the commission has exceeded the authority granted to it by the legislature; (3) whether the commission has decided the case without proper and substantial foundation in fact; (4) whether any Federal constitutional right has been infringed; (5) whether previous contractual relations, subject to legislation passed subsequent to the contract, have been made in good faith; and countless other questions not covered by existing orders, laws, or custom.

Jurisdiction, Powers, and Duties of State Commissions.—It has already been pointed out that, instead of determining the proper rates themselves, the legislatures of most states have delegated this power to a body created specifically for this purpose, usually designated as a commission. Since the legislature cannot grant to some other agency powers it does not itself possess, it goes without saying that the maximum powers possible for a state commission are those already delegated to the legislature by the state constitution, the scope of the powers and duties of the commission being contained in the enabling act.

The first commissions, both Federal and state, were created to reduce the charges of utilities to the lowest possible level and to guard against excessive future charges. Prevailing public opinion regarded with suspicion large corporations engaged in monopolistic business, and the people felt that the corporation would charge "all that the traffic would bear," which might be many times more than the prices that would obtain if they were determined by competition.

Powers granted to commissions are not the same in all states, and records show that the general tendency has been to enlarge these powers from time to time. More than the mere granting of power and designation of duties is necessary, however. A commission must be able to operate, and this requires funds. Without proper funds to pay the salaries of the commissioners and others under their direction and for making special investigations, a commission would be useless. Funds are provided through the general tax levy, through special levies on the utilities that are subject to regulation, or through both means. The growing tendency is to charge the costs of investigations to the utility being investigated, provided that such costs do not exceed certain maximum limitations. On the assumption that

the customers of the utility are to receive the benefits resulting from the investigations, it seems only reasonable that they should share the major portion of these expenses.

The jurisdiction of state commissions may extend to the charges, services rendered, securities issued, territory occupied, safety measures employed, etc., by railroads; warehouses; wharfs and docks; stockyards; water, street-car, gas, telephone and telegraph, and electric companies; bus and truck lines; taxis; and any other kind of company rendering strictly a public service or clothed with a public interest and operating within the borders of the state. The United States Supreme Court has ruled that gas and oil stations and ice companies are not of this type, but recently it has ruled that the milk business in New York is invested with a public interest. Jurisdiction does not extend to interstate operations, a field reserved to the Federal government under the Constitution; it may not extend to the intrastate portions of a business when these rates have a special bearing on the interstate business; nor does it extend to the management of the business.

Powers of a commission may extend from almost nothing, to that of a judiciary passing upon questions brought before it, or to that of a prosecutor and judge in the same person. The tendency is for both the jurisdiction and the power of a commission to enlarge from time to time, for the fixing of one element under its jurisdiction may require the determination and fixing of other elements not then under its jurisdiction. As time advances, the spiral of power grows larger and larger, ever increasing in scope, so that the duties imposed may become of such magnitude and extent that the effectiveness may be stunted and partly destroyed. Reduction in the number of laws is rare, and, even though laws may be repealed, new ones are usually passed, taking the place of those repealed. The regulation of transportation may cause the regulation of wages and salaries, which may cause the regulation of the cost of living, which may cause the regulation of the production and processing of food, clothing, and housing, which, in turn, may require the regulation of farmers' growing crops, factory wages, etc. At any time, a new discovery or development may change the whole outlook for a given type of utility, making unnecessary all or most of the existing rules and regulations for that business. When little

gasoline was used, oil inspection was necessary to assure the public that kerosene did not contain a dangerous amount of gasoline which might explode in lamps; but the demand for gasoline today makes inspection for such purpose unnecessary. Commissions, created for the purpose of keeping down railroad freight and passenger rates, find automobiles, water transportation under Federal subsidy, trucks, and airplanes doing part of their regulation by competition.

Investigations by commissions may be initiated by petitions of utility customers, acts of the legislature, petitions of governmental agencies, petitions of the utility itself, or motion of the commission without petition. The duties of the commission are then to determine the proper charges, service, etc., covered in the petition or complaint and the elements necessary to the proper determination of the matter contained in the petition.

The following citations have a direct bearing on the preceding discussion:

"In granting to corporations franchises to engage in the business of common carriers, the law contemplates a continuance of the public service, unless otherwise provided; and the law also contemplates an adequate and efficient service, and that a reasonable compensation therefor shall be allowed to comport with organic property rights; therefore, it is clearly within the legislative power and duty to enact regulations by which a reasonable return for service rendered by common carriers may be effectuated as well as to enact regulations by which excessive charges and unjust discriminations by common carriers may be prevented and redressed." *State ex rel. Triay v. Burr*, 79 Fla. 290, 84 So. 61, P.U.R. 1920D, 631.

"In practice no more fair and reasonable plan can be devised than to delegate this difficult and most technical duty to a board which is perpetually in session and furnished with skilled accountants and experts. The situation as to common carriers changes from year to year; sometimes from month to month even. A fixed hard and fast rate made one year might be almost confiscatory next year, or conversely, the rate fixed might become far greater than the service rendered is worth. No legislature has the time, nor is it equipped with the machinery necessary, to investigate matters of rate making in any manner which will serve to prevent its enactment of laws fixing alleged "reasonable maximum rates" from other than a mere guess." *State ex rel. Rhodes v. Public Service Comm.*, 270 Mo. 547, 194 S.W. 287, P.U.R. 1917E, 315.

"There was a time in the history of this country when carriers and public service corporations were so few that the legislature itself might

have performed that labor. By reason of the rapid growth of population and the great increase in the number of such corporations, it has become impracticable for the legislature to discharge that duty. Moreover, many rates may require alteration from time to time. That the most appropriate method (speaking from a practical, not necessarily constitutional, point of view) is the creation of a Commission or body of experts to determine particular rates has been said several times in the opinions rendered by the Supreme Court of the United States in the various Railroad Commission cases and in those of state courts." 191 N.Y. 123, 18 L.R.A. (N.S.) 713, 83 N.E. 693, 14 Ann. Cas. 606.

"The enforcement of a statutory provision authorizing and directing a state milk control board to fix minimum and retail rates for the sale of milk, in the light of an inquiry disclosing destructive and demoralizing cutting and reducing income of the farmer below the cost of production, was held to be neither unreasonable nor arbitrary in denial of the due process secured to a retail milk dealer by the 14th Amendment of the Federal Constitution." *Leo Nebbia v. People of the State of New York*, 291 U.S. 502, 54 Sup. Ct. 505 (1934), 2 P.U.R. (N.S.) 337.

"Neither a state Commission nor a Federal court reviewing an order of that Commission fixing intrastate telephone rates, has authority to pass upon the fairness of the division of interstate tolls between the telephone company involved in the rate proceedings and the interstate telephone company, in view of the exclusive jurisdiction of the Interstate Commerce Commission over such matters." *Smith v. Illinois Bell Tel. Co.*, 282 U.S. 193, 75 L. ed. 255, 51 Sup. Ct. 65, P.U.R. 1931A, 1.

The problem of the jurisdiction of state commissions over Federal power companies operating within the state, although the power is in transmission in interstate trade across the boundaries of several states, has been stated in the following decisions of the Tennessee and Alabama commissions concerning contracts with the Tennessee Valley Authority:

"The approval of this Commission to this contract and the ordering into effect the rates agreed to in said contract is not to be construed as an agreement to approve and maintain these rates in effect for the length of the contract, but the Commission is of the opinion that the rates and service of every public utility in Tennessee are subject to the regulation and control of this Commission, and this Commission cannot be deprived and denuded of its power and duties under the acts granting it its powers, or any future legislation, by the contract of parties establishing rates to be maintained, and all rates of every utility as defined by the law of the state of Tennessee are subject to the regulation of this Commission." *Re Tennessee E. P. Co. (Tenn. 1934)*, 2 P.U.R. (N.S.) 4.

"As we understand the law, municipal governments and state governments may and often do exercise both governmental functions and proprietary functions. It is a well-settled law of the country, as we understand it, when municipalities and states engage in a business like that of a private individual, they render themselves subject to the laws of the land applying to such business in like manner as if the municipality or state was itself an individual. . . . We have been unable to find any decision to the effect that these principles should not apply to the Federal Government as the courts hold they must be applied to state and municipal governments." *Re Alabama P. Co.* (Ala. 1934), 4 P.U.R. (N.S.) 233.

In the foregoing discussion, the need for regulation of utilities has been shown, and it was also shown that the natural evolution of the demand for fair and reasonable charges has resulted in the establishment of commissions, both Federal and state. Just what the limitations of the powers of the commissions are depends upon the enabling acts, the legislative and Constitutional restrictions, and the desires of the public. For example, Has a commission the right to set aside a rate schedule contained in a contract made prior to the establishment of the commission? Has it the power to make retroactive rates? Has it a right to agree to automatic changes in rates by agreeing to some adjustment beforehand which is dependent upon the cost of living index of the Department of Commerce, the cost of fuel, the tax rate, or the average wage paid to employees? These questions and others will be discussed more fully later, but whether or not they can be answered depends upon the laws of the state and previous fundamental court and commission rulings. In general, one may say that the inquiries to be made are along the following lines: (1) What powers have been delegated and denied by the people to the legislature as evidenced by the state constitution? (2) Are the laws passed by the legislature delegating powers to the commission in accordance with the state and Federal Constitutions? (3) Under what kind of a charter is the municipality operating, and was it granted prior to the enactment of the commission law? (4) What were the previous decisions on similar or nearly similar questions?

CHAPTER XXI

ELEMENTS UNDERLYING RATE DETERMINATION

Some of the factors underlying the determination of rates for public utilities are value of service measured by the ability of the customer to pay for the service; cost of delivering the service to the customers; competition among different classes of service and among utilities of the same class; comparison of rates charged by utilities of the same kind for like service; type and character of the community in which the utility serves, including character of the residence consumers and character of the business of the community; density of population; probable future growth of the city and the output of the utility; and other economic and social factors which are difficult to measure.

Value of the Service.—The starting point in the sale of utility service is the value placed by the customer on the service supplied. If the value of the electrical service rendered by the early electric central stations over an extended period had been less than the cost of rendering that service, development of the industry would have been improbable. The fact that the first central stations were able to render the service at a profit, however, enabled the utilities to expand their facilities and to secure additional customers. The value placed upon the service or commodity purchased is not the same for each individual; nor is the value the same for the total amount purchased by each individual. The value of the first few units is generally the greatest, and the value of additional units usually becomes less as the number of units purchased increases. This variation may be due to any number of reasons peculiar to the individual. He may have no use for more service; his economic status may prevent him from purchasing more; he may substitute the additional units for some other purchases which cost him less than the first units displaced; he may have esthetic reasons for the purchase of the first units and none for the additional ones. His desires for additional units may be increased by appealing to his pride and

by development of new uses for the product, so that he can secure better service or save money by the new device. He may also be able to secure the same service from other sources and, therefore, place a value upon it in this manner. Whatever method is used, the fact remains that the upper limit of charges is determined by the value placed on the service by the customers. This value may be different from year to year. During prosperous years, the value will generally be higher than during years of economic depressions. New developments occurring from time to time may also have their effect. When the cost of rendering the service is greater than the value so determined, the service cannot be rendered without a subsidy in some form or by the taking over of the operation by a governmental body that is able to pay for part of the cost from taxes.

Since the cost of rendering the utility service is generally less than the value of the service to the customer, charges that fall somewhere between these two limits might be construed as reasonable. In fact, because of the condition existing that certain common costs or overheads must be paid by the business as a whole, it becomes necessary to recognize the value of the service in determining the proper charge. In other words, if we assume that a rate below the value of service is reasonable and that the utility is to earn no more than a fair return on all its property from all its business, someone must determine the portion of costs common to all classes which is to be paid by the charges made to a particular class of customers and also that part of the first portion to be paid by each customer in the same class. As an example, assume that a utility is supplying gas to residences, commercial establishments, and industries and that the earnings are excessive. Are the excessive earnings due to the price paid by the residence customers, by the commercial establishments, or by the industries?

It is apparent that the excessive earnings can be eliminated by reducing the charges to one or all of the three classes of customers. A politically minded management might reduce the residential charges, for they affect the greatest number of voters. A sales-minded management might reduce the rates in those classes and at the points of use that would produce the greatest increase in sales (value of service). Some other kind of management would perhaps make the adjustment in some other manner,

perhaps by a flat percentage on all rate schedules. And perhaps, also, each of the three methods would be satisfactory, depending upon the conditions obtaining before the adjustment and the results desired to be accomplished.

The ease with which consumption increases with a reduction in price is sometimes spoken of as the "elasticity of demand." Human wants are seldom satisfied, and the capacity to possess all the luxury our modern civilization provides seems almost unlimited. Some utility services are such that their uses are very sensitive to the prices charged, whereas others are more or less static. In general, services requiring little or no capital outlay on the part of the purchaser are much more sensitive than services requiring such investment in equipment for utilization. Transportation by public carriers and telephone communication fall in the former class, whereas electric, gas, and water service fall in the latter. One may, therefore, conclude that the value of the service determines the maximum charges and that a utility serving a variety of customers is confronted with the problem of taking into consideration this particular item, which in turn is determined by the customers by their ability to pay, by charges for the same service elsewhere, by price of substitute service, by desirability of the particular class of service, by intangible value of the service, or by one of many other items.¹

¹ State Pub. Util. Comm. *ex rel. Springfield v. Springfield Gas & E. Co.*, 291 Ill. 209, 125 N.E. 891, P.U.R. 1920C, 640; *Public Service Comm. v. Great Northern Util. Co. (Mont.)*, P.U.R. 1929B, 12; *Re New York Tel. Co. (N.Y.)*, P.U.R. 1930C, 325; *Farm Bureau Federation v. San Joaquin L. & P. Corp. (Cal.)*, P.U.R. 1932D, 310; *Freeport v. Nassau & S. L. Co. (N.Y.)*, P.U.R. 1924A, 96; *Re Commonwealth Tel. Co. (Wis. 1937)*, 19 P.U.R. (n.s.) 331; *Covington & Lexington Turnpike Road v. Sandford*, 164 U.S. 578, 41 L. ed. 560, 17 Sup. Ct. 198; *Smyth v. Ames*, 169 U.S. 477, 42 L. ed. 819, 18 Sup. Ct. 418; *Hartford Village Fire Dist. (Conn.)*, P.U.R. 1931C, 320; *Re Wisconsin Tel. Co. (Wis.)*, P.U.R. 1932D, 173; *Re Michigan Bell Tel. Co. (Mich. 1934)*, 4 P.U.R. (n.s.) 164; *Re Pacific E. R. Co. (Cal.)*, P.U.R. 1922C, 134; *Re Wiscasset Water Co. (Me.)*, P.U.R. 1932C, 34; *Re Delaware & Atlantic T. & T. Co. (N.J.)*, P.U.R. 1921D, 535; *Moncton Tramways, E. & Gas Co., Ltd. (New Brunswick)*, P.U.R. 1932B, 368; *Joplin Gas Co. v. Missouri Pub. Service Comm.*, 296 Fed. 271, P.U.R. 1924D, 137; *Re Wholesale Rates for Power to Rural Cooperatives (Ky. 1937)*, 19 P.U.R. (n.s.) 22; *Texas & Pacific R. Co. v. Interstate Commerce Comm.*, 162 U.S. 197, 40 L. ed. 940, 16 Sup. Ct. 666; *Re Georgia P. Co. (Ga.)*, P.U.R. 1931E, 449; *Department Pub. Service v. Puget Sound P. & L. Co. (Wash. 1936)*, 11 P.U.R. (n.s.) 75.

We cannot agree that any opinion of the United States Supreme Court sustains the proposition that in fixing a fair and reasonable rate the customer's ability to pay and the value of the service to him are paramount and controlling. If rates are so low as to be confiscatory of the utility's property, they are condemned by the Fourteenth Amendment.—*Telluride P. Co. v. Utah Pub. Util. Comm.* (1934), 5 P.U.R. (n.s.) 199.

Cost of Service.—Reference has been made in the previous section to the cost of service, especially in its relation to the value of service, but no definition or explanation of the meaning of the term was made. It was assumed that a cost existed without assuming at the same time that it could be determined. Needless to say, the determination of the cost of a particular portion of service is by no means an easy problem in cost accounting. The scope is so broad in the case of utilities that many viewpoints result in many different answers. To illustrate these difficulties when applied to a somewhat different field, let us take the case of a farmer who purchases a 160-acre farm for \$16,000. Besides the land, the farm contains a group of buildings, including a dwelling, a horse and cattle barn, a hen house, a machine shed, a granary, a hog barn, and a garage, worth in all perhaps \$8,000. He moves onto the farm in the spring with horses, cows, chickens, household furniture, and farm machinery worth in all \$2,500. His entire investment is, say, \$18,500.

A portion of his farm is in pasture, a portion in meadow, and the remainder in tillable land. He purchases seed, hay, and feed to the extent of \$500 and plants portions of his farm in corn, wheat, barley, and potatoes. A small garden is devoted to vegetables for the table. When a year rolls round, he finds that his entire income has been his living for himself and family and sales of products amounting to \$3,000. What has it cost him per dozen eggs; per bushel of wheat, oats, or barley; or per hundred weight of milk?

If he assumes that his investment should bring him a return of 5 per cent, his own time to be worth \$1,500 (because he left a job in a near-by town where he was earning that amount), he may put down his expenses as shown in table on page 311.

Although he is convinced that his total expenses were \$2,835, he does not yet know what it has cost him to produce a bushel of grain or 100 lb of milk.

To get at an approximation of the cost of the several items, he might reason in this manner: The investment in land is \$50 per acre; in barn, \$2,500; in hog barn, \$800; etc. The pasture would cost only \$2.50 (5 per cent on \$50) per acre; the plowed land, \$2.50 plus the cost of plowing, seeding, cultivating, and harvesting; the horse and cattle barn, \$40 for interest and \$30 for depreciation, etc. By a process of reasoning, he may arrive, finally, at a cost figure for each class of product and come to the conclusion that some one product cost as much or more than he received for it. Or it may lead him to conclude that his *allocation* of certain expenses was not correct, that his reasoning was faulty, and that

| | |
|--|---------|
| Interest at 5% on \$18,500..... | \$ 925 |
| Salary to himself (\$1,500 less credit for food and rent obtained)..... | 1,000 |
| Taxes..... | 200 |
| Veterinary expenses | 50 |
| Gasoline, oil, and truck repairs | 300 |
| Farm hands during summer..... | 250 |
| Machinery repairs and replacements | 75 |
| Insurance on buildings and equipment..... | 35 |
| | <hr/> |
| | \$2,835 |

his figures should be revised. One thing which convinces him that his reasoning is faulty is that on a 160-acre tract adjoining his farm, not equipped with buildings of any sort but planted to corn, which was planted, cultivated, and harvested by hired help, the cost per bushel of corn was less than he himself determined for the same grade and product on his own farm. He could not well go to the owner of this other farm and tell him that the cost per bushel of corn was 60 cents when the owner could prove the contrary by showing his records which disclose the cost to be 50 cents. All that Mr. Farmer could do would be to say that, if Mr. Owner raised corn at a cost of 50 cents per bushel, his own corn should cost no more, for the farms are adjoining and are of the same fertility. Knowing this one cost item, he could then go back over his cost figures and revise them in the light of this new information and again arrive at a cost for the remainder of his products.

He might also come to the conclusion that, because of the large flock of hens requiring corn and other grain that otherwise could be sold, he should reduce the size of his flock to the number able

to get subsistence from products of the farm that otherwise might go to waste and thus determine the number of hens that would give him the maximum profit *under his conditions of operation*. Or he could start with a small number of hens and gradually increase the number, keeping a record of the *additional* costs and the *additional* income from the sale of *additional* eggs and hens, and thus arrive at the incremental cost of producing eggs and hens for *any particular size* flock he may have.

Although this farmer has many problems in common with a utility rendering several classes of service, when he tries to determine the cost per dozen eggs, per hundredweight of milk, or per bushel of wheat or oats, he does not have to determine his selling price. That is determined for him by "the market," and the reason for trying to determine the costs of his several products is to find out whether he shall expand or reduce any particular activity. He must keep his production expense below his income, or he is faced with bankruptcy. A utility, because it must render service at cost, or nearly so, is confronted with the determination of the cost, so that proper prices for the service rendered can be set with justice to all its customers.

Nearly all utilities have some transactions that are of a non-utility nature. Portions of buildings owned by a utility may be rented to professional men such as physicians, dentists, and lawyers; land may be rented for farming; old equipment may be sold to a junk dealer. To further its ends, a utility may engage in the merchandising of appliances. Also, one company may own and operate several utilities in the same city, such as one or more of the following: electric, gas, water, telephone, street railway, and central heating. Such consolidation permits one or more portions of the equipment to be operated in common, so that, in determining the costs of the operation of each, an *allocation* of expenses among the several branches must be made. A combined gas and electric utility may use the same warehouse, office building, and meter readers. To determine the cost of each utility service, the portion of such items as are common to both, which is to be charged to each branch, must be determined. Such determination is referred to as "an allocation of expense." An electric generating plant may be operated in conjunction with a steam-heating system. Shall the exhaust steam be considered as a by-product of the electric plant, or shall both utilities share

equally in any economies that may result from the combined operation? Before bases of allocation can be discussed intelligently, an investigation of the costs involved is necessary, and these will be considered in the next section.¹

Fixed and Operating Expenses.—All utilities are generally able to classify their entire expenses under two main headings: fixed and variable. The “fixed costs” are those which remain the same whether the amount of business is the same from month to month or whether it varies from small to large amounts. The money invested in the business demands its wage in the form of interest, and this item continues the same from year to year except for change in the amount invested, change in interest rates by refunding, or change in relative amounts of bonds and stocks outstanding. Besides costs of this nature, the utility must have a minimum number of employees whose wages must be paid regardless of the amount of business the utility may be doing. A railroad has a large investment in right of way, in rails, in buildings, and in rolling stock; a gas utility has money tied up in gas mains, manufacturing equipment, and gas in holders and pipes; a water utility, in mains, pumps, etc.

In addition to the fixed costs, nearly all utilities have expenses of operation that vary from month to month, depending upon the amount of sales. A gas utility must purchase more coal and other materials to make more gas during periods when more gas is sold. A water utility must pump more water when more is needed by its customers. The output of an electric utility varies greatly during the year because of the change in length of the day and the seasonal demands of industries. All these expenses are called “variable expenses,” for they vary according to some law tied up with variations in the output.

¹ Re Arkansas L. & P. Co. (Ark.), P.U.R. 1920D, 775; State Pub. Util. Comm. ex. rel. Springfield v. Springfield Gas & Electric Co., 291 Ill. 209, 125 N.E. 891, P.U.R. 1920C, 640; Public Service Comm. v. Great Northern Util. Co. (Mont.), P.U.R. 1929B, 12; State Journal Printing Co. v. Madison Gas & E. Co., 4 Wis. R.C.R. 501; Re Heppner L. & Water Co. (Ore.), P.U.R. 1919C, 870; Re Pacific T. & T. Co. (Ore.), P.U.R. 1922C, 248; Re Lone Star Gas Co. (Okla.), P.U.R. 1933C, 1; Railroad Comm'rs v. Atchison, T. & S.F.R. Co., 22 I.C.C. 407; Pennsylvania P. & L. Co. v. Public Service Comm., 128 Pa. Super. 195, 193 Atl. 427 (1937), 19 P.U.R. (N.S.) 433; Chicago v. Rogers Park Water Co., 214 Ill. 212, 73 N.E. 375; Re Great Northern Util. Co., 289 U.S. 130, 53 Sup. Ct. 546, P.U.R. 1933C, 225.

Expenses of Water Utilities.—Besides the expense of pumping, purifying, and treating the water with chemicals, a water utility must read and test meters, send out and collect bills, make the necessary repairs to its machinery and mains, and pay interest on money borrowed to operate the plant. Sometimes water utilities that are municipally owned and operated assess property along streets where mains are laid, similar to assessments for grading, paving, etc., to pay for all or a portion of the cost and thus avoid paying interest on the investment in mains so constructed. The size of the pumps and other equipment must be sufficiently large to supply the water required at all times. The capacity of pumps and of filtering and treating equipment is not necessarily that which would be required to supply the instantaneous demand, because storage reservoirs are erected from which water can be withdrawn when the requirements of the customers exceed the amount being pumped, the storage reservoirs being filled later when the demand by customers diminishes.

This general demand of any city is nearly proportional to the population of the city, this proportionality factor increasing with the population and the commercial demands of the city. The demand for water for fire-protection purposes is an extremely variable quantity, being very little at most times and occasionally approaching large peaks. The water utility must be able to deliver this demand at any point in the city under short notice, requiring an excessive installation in pumps, mains, and hydrants over that necessary for a strictly residential and business demand. The municipality also requires considerable water for city buildings, public parks, street sprinkling, sewer and street flushing, etc. These demands vary from month to month according to the seasonal requirements of the city and the residence consumers. However, a considerable portion of the operating expenses of a water utility is fairly constant in amount as compared with utilities with more variable demands and for which storage is not possible. The allocation of these expenses will be considered under rates for water utilities.

It is thus apparent that a very large portion of the entire expense remains the same from month to month regardless of the amount of water used. Fixed charges are also increased because of extra investment in pumps, mains, and fire hydrants. Water mains are larger than necessary to supply the water requirements

of customers, for fire-insurance regulations require mains of adequate size to supply sufficient water for fire protection. Occasionally, water mains must be "flushed out" to remove sediment lodged in them.

Expenses of Gas Utilities. *Manufactured Gas.*—A manufactured-gas system consists of a gas-generating plant, gas storage holders, transmission mains, and a distribution system. Two kinds of gas are made, coke-oven gas (coal gas) and water gas. In making coke-oven gas, coal is heated in oven retorts, the gas being driven off by applying heat. It is then purified to remove water, tar, ammonia, and other impurities and is pumped into gas holders from which it passes into the transmission system or distribution mains. Water gas is formed by passing steam through a bed of hot coal where the steam combines with the carbon in the coal, forming hydrogen and carbon monoxide gases. This gas is also purified, and it is enriched by the introduction of gas oil to increase the heating value to the standard required for the particular system. The impurities removed from the gas as well as the coke produced in the manufacture of coke oven gas are useful and valuable by-products that can be sold.

It is seen that, in addition to the fixed charges on all equipment, a gas company has operating expenses made necessary by the purchase of coal and other supplies, payment for labor to operate the manufacturing plant, repairs and maintenance of manufacturing equipment and mains and distribution system, labor for reading and repairing meters, billing and collecting, soliciting new business, caring for complaints, etc.

Natural Gas.—Natural gas is found in the ground, usually in conjunction with oil fields. It comes from the ground in a fairly pure state and at pressures depending upon the depth of the strata from which it is being extracted, the deeper strata having the greatest "rock pressure." Sometimes this gas also has other valuable products, which must first be extracted before it is used by ordinary gas consumers. These by-products consist of helium gas and a highly volatile gasoline. The helium is used by the Federal government for balloons and dirigibles. The gasoline is extracted and mixed with lower grade gasolines for use in automobile and airplane engines. Since the gas wells seldom are found near centers of population, the natural gas must be transmitted to market in high-pressure transmission mains, sometimes

for hundreds of miles. The pressure of this gas is reduced at the city limits, and the gas is either distributed directly into the distribution mains or is mixed with lower grade manufactured gas to make what is known as a "mixed gas." The expenses of a natural-gas system are similar to those of the manufactured-gas utility with the exception of the cost of manufacture and the addition of the cost at the well and that of transmission.

Expenses of Electric Utilities.—The property of an electric utility usually is divided into generating equipment; transmission facilities to carry the power from the generating stations to load centers; distribution facilities, which take the power from the terminals of the transmission systems and carry it to the consumers; and other property such as office buildings, warehouses, and garages. Where the generating plant is located near the consumers, as may be the situation in a small or medium-sized community, little or no transmission is necessary. Distribution is accomplished by a primary and secondary system of electric conductors with "line" transformers of suitable size and suitably located to transform the power from the higher primary voltage to the lower secondary voltage. The primary voltage is 2,300, 4,000 or 6,900 volts, and that of the secondary is 115 and 230 volts. Direct-current distribution is omitted for the reason that only a small amount of electrical power is at present distributed by this means, and such installations as do exist are "hang-overs" from the early days and are not being enlarged.

The reader who is not familiar with the principles of electrical engineering will perhaps wonder why there are so many voltages for power transmission and distribution. Although it is impossible to include in this short volume a treatise of sufficient length to explain the reasons therefor even in an elementary way, nevertheless a brief explanation will be undertaken, with the hope that it will give a clearer understanding of this particular industry. Electrical power is proportional to the product of voltage and amperage. Voltage is analogous to pressure of water in a pipe, and electric current or amperage is analogous to the rate of water flowage in the pipe. Electrical conductors offer some resistance to the flow of current which must be overcome by the voltage, this resistance being proportional to the length of the conductor and inversely proportional to its size or weight per unit length. That is, two wires of the same metal and of the same length, but

of different diameters, will offer resistance to the flow of electricity inversely proportional to their weights. Because of the flow of current in the wire, there is also a loss of energy which is proportional to the square of the current. By increasing the voltage, thus reducing the current for a given amount of power, the relative loss in transmission is decreased. By doubling the voltage to transmit a certain amount of power, the current is decreased to one-half, so that four times as much power may be transmitted over the same size and weight of conductor, without increasing the proportionate loss.

By the use of alternating currents, transformers may be made use of to change from one voltage to another. These devices are very high in efficiency of conversion, are relatively cheap in first cost, and have no moving parts requiring attendance of operators. By this means, a safe voltage, 115 volts, is delivered to the customer, although a high and dangerous voltage is used for the transmission of power to these transformers. The distances of transmission may be made longer by using higher voltages, whereas the energy for the customer is transmitted for only short distances at the low voltages. Offsetting the saving in the cost of the conductors is the cost of the transformers, so that in each power system a balance must be struck among voltage for transmission, number and size of transformers, and the size of wires that will give the least over-all cost of operation.

The generating station, if hydroelectric, must be placed on a stream at a suitable location for the generation of energy, and the power must be transmitted from that location to the load center. A steam generating station can be located closer to the load center, thus obviating the necessity of much transmission expense. The economies of transmitting energy electrically over wires must be balanced against the expense of transporting fuel and converting the latent energy of the fuel into electrical energy at the place where it is needed. The problem is one of transportation of the energy from the source to the point of consumption at the least over-all expense, including the cost of money and cost of operation. Electric-light and power systems are the result of continuous growth, due both to a constantly increasing number of customers and to an increase in use of the product by existing customers.

Often the increase in load is so rapid that the capacity of equipment installed soon becomes inadequate to carry the load, and additional capacity must be provided. Whether this additional capacity is obtained by the addition of new equipment, leaving the existing equipment unaltered, or replacing some or all of the existing with new equipment of larger capacity is a matter that must be decided at the time of its installation. The determination of the proper size of equipment requires a study of the growth of the business to be expected in the future, and the size so determined is not always within the realm of accomplishment. For instance, a utility may have an undeveloped water-power site that will provide a definite amount of capacity, and this amount may be considerably more than the study of the trend of future requirements indicates as proper. Under such circumstances, the utility would be justified in seeking a market for its surplus or "dump" power to get as much revenue as possible, even though the rate obtained from the sale of such surplus may be small.

Another complication in the development of hydroelectric power and its continuous delivery to a point of use is in the unreliability of rainfall and stream flow for most such installations. Should the generating equipment and transmission facilities be provided for the minimum flowage that will provide the energy without reservoir storage, for the average flow with proper dams and storage reservoirs on the head waters, or for the maximum flowage of the stream without loss by wastage in times of high water and floods? The minimum flowage determines the "base load" energy of the installation. Any excess power at high-water periods furnishes a less valuable dump-power output. Most systems supplied from hydroelectric energy require adequate reserve capacity of steam plants for use during low water or due to failure of the hydroelectric plant or transmission system. This additional stand-by equipment in steam plants is an added expense both in capital or fixed charges and in operating expenses during their operation.

Consumer Costs.—There are certain operating costs that are practically the same for each consumer independent of his demand or of the amount of commodity used. These costs, known as "consumer costs," cover interest, depreciation, and maintenance on the services connecting the customer with the mains or wires

of the utility; meter and meter installation fixed charges and upkeep; repairs and calibration of the meters; reading of meters; and billing, bookkeeping, and collecting costs. They may be slightly larger for customers using a large demand for water or gas service on account of the larger investment in service pipe and meter and similarly for large consumers of electrical energy. However, the additional costs of serving such users can easily be absorbed elsewhere in the schedule. For three-part rates, these charges are separated and form one part of the rate structure, the same to each customer. For two-part rates, these charges may be divided between the service charge and the commodity charge or all may be absorbed in the service charge. For block-rate schedules, these charges are merged with the first steps of the rate schedule.¹

Demand Costs.—The amount of service withdrawn by a customer from the utility's supply system at each instant is known as his demand. The demand of a customer is seldom the same from hour to hour, from day to day, or from month to month. It may increase or decrease from year to year according to the change in the needs of the customer, growing out of changes in living conditions, changes in business conditions and growth or decrease of requirements, changes in working hours, and changes in daylight hours. A curve drawn with the demand of the customer as ordinates and units of time as abscissas is known as a "load curve." When plotted over a 24-hr period, it becomes a "daily load curve." Similar curves may be constructed for a week, a month, or a year, in which cases they become "weekly," "monthly," or "yearly" load curves.

Little or no water is used by the ordinary residence during the night. During the day the demand is expressed in "gallons per minute," "cubic feet per hour or day." The maximum amount used per hour during the day or month is referred to as the "maximum hourly demand for the day or month," respectively. The ordinary gas range has a maximum demand of about 60 cu ft of gas per hour. Although the monthly consumption

¹ *Pekin v. Pekin Waterworks Co.* (Ill.), P.U.R. 1917C, 838; *Re Minimum Monthly Charges for Lighting Service*, 1 N.J. P.U.C. 239; *Re Northern States P. Co.* (Wis. 1937), 19 P.U.R. (N.S.) 153; *Maires v. Flatbush Gas Co.* (N.Y. 1st Dist.), P.U.R. 1920E, 930; *Re St. Joseph Gas Co.* (Mo.), P.U.R. 1928B, 755.

of gas for cooking purposes may be 1,500 cu ft, which gives an average demand of about 2 cu ft per hour, the maximum demand, which occurs on Thanksgiving and other holidays and Sundays, is many times this amount. More telephone calls are made during certain hours of the day than during others. When the amount of power taken from electrical lines is not constant, but instead varies, the maximum taken during any period is known as the "maximum demand" for the period which may be the day, month, or year.

It is thus apparent that the item of demand is an important element in cost to serve. Large demands for water and gas necessitate large pipes or mains. A greater number of telephone calls requires the use of more equipment. Heavy demands for electrical power necessitate the installation of larger wires and transformers.

Instead of using the instantaneous demand on an electrical system, the average amount during certain specified short intervals of time, say 15 or 30 min, is used. This type of demand is known as a "15-min interval" or "half-hour interval" demand and corresponds to gallons per quarter hour or half hour, respectively. In electrical systems these demands are easily determined by the use of demand meters. Two types of demand meter are in general use, *viz.*, the indicating type and the recording type. Where the demand is determined by the use of an indicating demand meter, the greatest demand during the month is recorded on the demand dial. At the time the meter is read, the demand pointer is reset to zero. This meter does not determine the period of the day or the day of the month when the maximum demand occurred, neither is there a record of what the load of the customer was at other periods. A recording demand meter shows the demand in kilowatts during each interval of the day, by recording the demands on a strip or disk of paper actuated by a clock so as to move slowly in the same direction continuously. It is of course necessary to replace the strips or disks at frequent intervals, weekly or semimonthly. In such instruments, care must be taken that the inked line is not too wide so that the proper demand may be easily determined. Unless the line drawn on the paper is very narrow, a considerable error may result. The width of these charts is only a few inches; when they are used to determine a demand in the neighborhood of several

hundred kilowatts, a line $\frac{1}{16}$ in. wide may represent several kilowatts.

On account of the fact that the maximum demands of two or more customers of a utility do not always occur at the same time, in a given day, month, or year, the sum of the maximum demands of the several customers is usually more than the maximum demand supplied from the utility's system to the whole group of customers. The quotient obtained by dividing the sum of the maximum demands of customers in a given group by the coincident maximum demand of the group is known as the "diversity factor." With some classes of users, there is little diversity among customers, and with others there is considerable. Because darkness creeps over a large area at the same time, little diversity occurs among lighting loads. On the other hand, the diversity of use of small motors, ranges, and appliances may be considerable. The sum of the sizes in kilowatts or horsepower of the several motors driving the machines in a factory and other equipment such as lighting and heating is known as the "connected load" of that factory. The demand for power from such a factory is usually much less than the connected load, because all the machines usually are not running at full load at any one time. This diversity of the needs for the machines causes the demand to be less than the connected load, and the actual demand is sometimes called the "active connected load" of the factory.¹

Charges should not be uniform to groups of electric customers having varying diversity factors, since if the diversity factors of the different groups be overlooked, customers in groups having low diversity factors receive substantial benefits at the expense of customers having higher diversity factors. It was found that municipal resale customers had a diversity factor of 1.07; customers receiving service under a power rate schedule had an overall factor of 1.40. The ratio between the two factors was approximately 1.30. This simply means that the unit demand charges reflecting the fixed costs of generation should be 30 per cent higher for municipal resale customers than for industrial power

¹ Re Rochester Gas & E. Corp. (N.Y.), P.U.R. 1931D, 31; Re Consumers P. Co. (Mich.), P.U.R. 1928D, 698; Re Edison E. Ill. Co. (Mass.), P.U.R. 1928D, 859; Re Hyrum City Municipal E. L. Plant (Utah), P.U.R. 1924D, 525; Neenah v. Wisconsin Traction L. H. & P. Co. (Wis.), P.U.R. 1915A, 372; Re Salt Lake & Utah R. Co. (Utah), P.U.R. 1922D, 61; Re Utah P. & L. Co. (Utah), P.U.R. 1921C, 294.

customers.—*Re Wisconsin Public Service Corp.* (Wis. 1935), 7 P.U.R. (N.S.) 1.

Diversity is undoubtedly higher for low load factor customers than those with high load factors. For example, customers with 100 per cent load factor cannot possibly have a diversity and customers with load factors in excess of 50 per cent cannot possibly have a diversity as great as 2 to 1 and under all probable conditions will only slightly exceed 1 to 1. On the other hand, customers with load factors below 5 per cent, unless governed by very peculiar conditions, must have a high diversity, and as the load factor approaches zero the diversity must approach infinity. Viewed from another angle, to obtain an average of 2 to 1, when there is a considerable number of customers with load factors in excess of 50 per cent, those below 50 per cent must obviously exceed 2 to 1. The diversity of customers of 15 per cent load factor (the average) is probably approximately the same as the average for the class, namely 2 to 1; at 10 per cent load factor, the diversity would be at least 3 to 1; at 5 per cent load factor at least 4 to 1; and it would rapidly increase as the load factor fell below 5 per cent.—*Re New York Edison Co.* (N.Y. 1935), 10 P.U.R. (N.S.) 244.

Beginning with the connected load, the following diversity factors (neglecting losses) exist between this load and the power plant supplying the energy:

1. *Connected-load diversity factor.* This is the quotient obtained by dividing the connected load by the customer's maximum demand.
2. *Transformer diversity factor.* The ratio of the sum of the maximum demands of the customers supplied from a particular transformer to the maximum demand on the transformer.
3. *Feeder diversity factor.* The ratio of the sum of the maximum demands of the transformers to the maximum demand of the feeder supplying the transformers.
4. *Substation diversity factor.* The ratio of the sum of the maximum demands of the several feeders supplied by a substation to the maximum demand of the substation.
5. *Transmission diversity factor.* The ratio of the sum of the maximum demands of the substations to the maximum demand of the transmission line supplying the substation.
6. *Generation diversity factor.* The ratio of the sum of the maximum demands of the transmission lines emanating

from a generating station to the maximum demand of the station.

If losses are neglected, the diversity factor between the connected load of all customers and the generating station is the product of the several diversity factors involved between the customers and the station.

A demand of 1,000 kw at the generating station will require generating capacity of at least that size to supply it. To provide for possible accidents to the equipment, additional capacity must

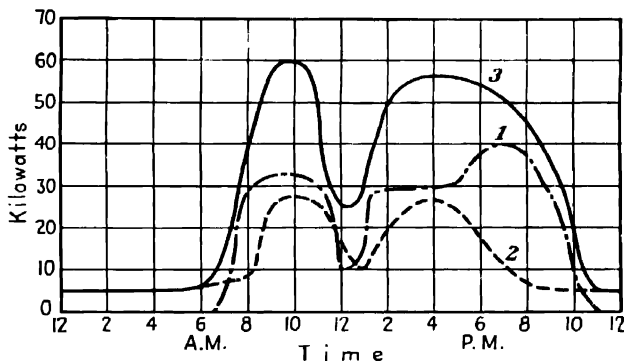


FIG. 3.—Daily load curves of two consumers. Curve 1 with peak at 7 P.M., curve 2 with peak at 10 A.M., curve 3 the combined load with peak at 10 A.M.

be supplied. If the station is equipped with three 500-kw units, two are sufficient to carry the load at one time, the third being left as a spare unit. Because of diversities in the system, the 1,500-kw station with its 1,000-kw demand will supply the power required by customers having individual demands summing up to several times this amount. The amount of investment by the utility in all facilities is, therefore, dependent upon the demands, both individually and collectively. Hence, the amount of the customer's demand is an important factor in the cost of serving him. The demand charge is an important element in determining every rate schedule.¹

¹ State Journal Printing Co. v. Madison Gas & E. Co., 4 Wis. R.C.R. 501; Greensburg v. Westmoreland Water Co. (Pa.), P.U.R. 1917D, 478; Re White Mountain P. Co. (N.H. 1937), 18 P.U.R. (N.S.) 321; Munsie v. Hampton Waterworks Co. (N.H.), P.U.R. 1919E, 414; Fuhrmann v. Buffalo G. E. Co. 3 P.S.C. N.Y. (2d Dist.) 739; Nash on Economics of

Curve 1 in Fig. 3 represents the daily load curve of one customer whose peak load of 40 kw occurs at about 7 p.m. Curve 2 represents the load curve of another customer whose peak load of 28 kw occurs at 10 a.m. The combined load curve of both customers is represented by curve 3, and the peak load of 60 kw occurs at 10 a.m. In this instance the diversity factor is $28 + 40$ divided by 60, or 1.13.

Public Utilities P. 160; Lyndon on Rate Making for Public Utilities, p. 160; Re Hyrum City E. L. Plant (Utah), P.U.R. 1924D, 525; Rhodes-Burford Home Furnishing Co. v. Union E. L. & P. Co. (Mo.), P.U.R. 1916B, 645; Missouri Pub. Service Comm. v. Laclede Gas L. Co. (Mo.), P.U.R. 1929A, 562; Re Alabama P. Co. (Ala. 1934), 3 P.U.R. (N.S.) 148; East Bakersfield Improvement Ass'n v. San Joaquin L. & P. Corp. (Cal.), P.U.R. 1916C, 830; Re Laporte Gas & E. Co. (Ind.), P.U.R. 1921A, 824; Public Util. Comm. v. Duquesne Light Co. (Pa. 1937), 20 P.U.R. (N.S.) 1; Re Consumers P. Co. (Mich. 1936), 14 P.U.R. (N.S.) 36; Re Wisconsin-Michigan P. Co. (Wis. 1934), 4 P.U.R. (N.S.) 276.

CHAPTER XXII

ELECTRIC RATES

In General.—In order to fix proper rates for any service, the rate base, the operating expenses, the rate of return to be earned, a survey of the loads of the different customers, and many other pertinent facts must be known in advance.

The fixing of rates and the equitable division of charges on an extensive electric system is a problem in the solution of which no exact rule or formula may be used but the approximate cost of rendering the several classes of service, the economic value of the service to the individuals and groups of consumers, the rates heretofore in effect and their results on the operation of the consumers, the elimination of discriminatory charges among classes and districts, and the general effect of new rates on future development of the business must be considered.—*Re Pacific Gas & E. Co. (Cal.)*, P.U.R. 1923C, 385.

The generation of electricity is completely dependent upon the requirements of the customers at each instant. When little energy is used, little is generated. In Fig. 4 are shown typical daily load curves of a rather large system, the solid one for a Monday in December and the dotted one for a Tuesday in the following July. It will be noted that for this particular system the "maximum load," better known as the "peak load," occurred at 5:30 P.M. The ratio of the average daily load to the peak load for that day is known as the "daily load factor."

At the time of occurrence of the peak load, the amount required by residential, commercial lighting, and power customers may be one-fourth, one-fourth, and one-third, respectively, with losses and miscellaneous uses, such as street lighting, requiring the remaining one-sixth. Therefore, residence customers who are responsible for one-fourth of the peak load should, theoretically at least, pay one-fourth of the station fixed charges, commercial customers one-fourth, power customers one-third, and miscellaneous services their proper share, with a slight addition to each for the losses. In other words, each class of customers is

responsible for a certain portion of the station peak load, and each class should, therefore, pay fixed charges on the station capacity required to supply the load created by it. In Fig. 5 are shown typical load curves of an industrial district as compared with a residential on a winter day. Note how rapidly the industrial load declines beginning about 4:00 P.M. and how rapidly the residential load increases beginning about 4:30 P.M.

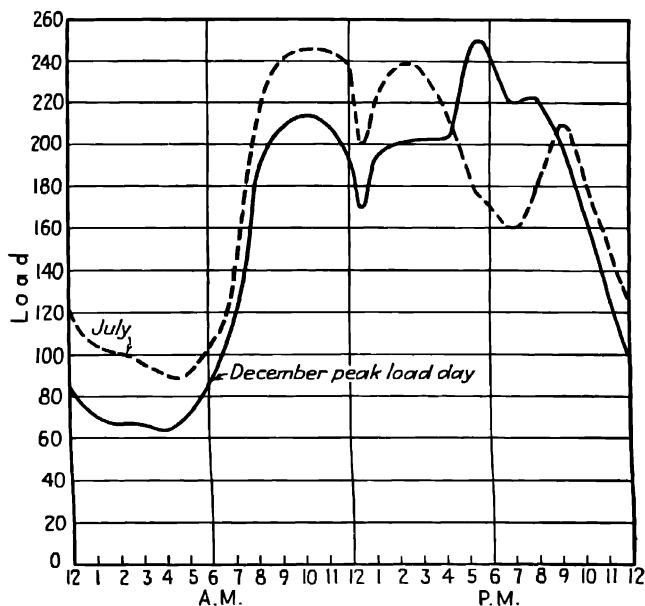


FIG. 4.—Daily load curves for July and December.

From a survey of the load curves of the customers as to time of day and period of the year, these customers can be grouped into classes, and to each group a given type of rate structure may be applied. The amount and duration of the demand as well as the period of the day in relation to the general load curve of the utility helps in allocating the fixed charges and the operating expenses. The maximum demands of some loads, such as commercial lighting, occur at the time of the peak load of the station, and they should contribute fully to the fixed charges of the plant. On the other hand, off-peak service need not contribute

to the fixed charges to any great extent but should partake of the consumer and operating costs of the system. Power loads as a group usually occur during off-peak periods and hence are responsible only partly for the peak load. On account of these and other factors, it is necessary to make very careful cost analyses of the whole load structure of such a system.¹

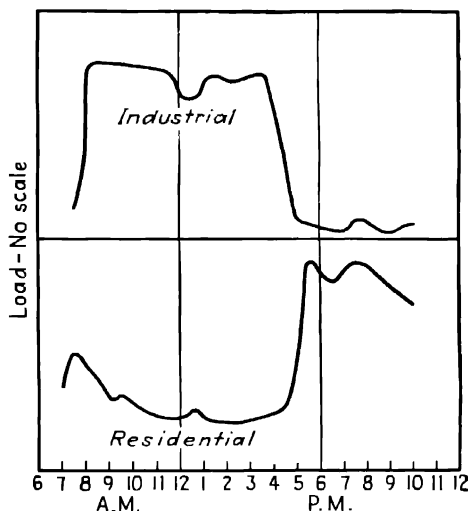


FIG. 5.—Typical winter-day load curves. A, industrial, B, residential.

Apportionment.—In making the cost analysis of the operating expenses and fixed charges of any utility property, it is necessary first to separate nonutility property, income, and expenses from those having strictly to do with production of the service. It is also necessary to allocate these items among several divisions of the same company, should it be operating more than one kind of utility service. After this has been done and the portion charged to electrical operation is known, it is then necessary to determine the amounts to be allocated to consumer costs, demand costs, and energy costs. The amount of the consumer charge must then be divided equally among the consumers.

¹ *Maires v. Flatbush Gas Co.* (N.Y. 1st Dist.) P.U.R. 1920E, 930; *Re Green Mountain P. Corp.* (Vt.), P.U.R. 1930B, 172; *Re Elko-Lamoille P. Co.* (Nev.), P.U.R. 1931C, 15.

It is next necessary to determine the portion of the fixed charge that is applicable to each class of customers. This is done by ascertaining the amount of the load that each class contributes to the maximum demand or peak load of the system. The fixed charge is then divided among classes in proportion to the demand of each class that contributes to the station demand. The demand portion of each class is then divided among the consumers in that class in proportion to the demand of each consumer.

This procedure, although being satisfactory from some viewpoints, cannot be followed exactly in practice. One must consider the stability of the business, the amount and extent of a particular load in the future, and its effect on additional capacity required. Large commercial and industrial loads are subject to the competition of private plants so that the upper limit of charges, regardless of what the cost analysis may show, is set by outside influence. In other words, a cost analysis prepared in accordance with the foregoing may result in charges higher than some customers would pay, because of their belief that, by installing plants of their own, they could generate their own requirements at less expense. The price so determined would be above the value of the service to the customers. Usually, however, even though rates charged such customers do not provide the entire costs as determined by a stated method of allocation of common or overhead expenses, they do pay more to the utility than the incremental expense incurred in serving them and thus absorb a portion of these overhead expenses, it being thus possible to allocate less of such expenses to residential customers than would otherwise be necessary.

In the early days of the industry, when practically the only use made of electric service was for lighting, and this was used for only a few hours in each evening, a charge of a certain amount per lamp per month (known as a "flat rate") was fairly equitable. With the great number of uses today, such charges are seldom used except for street lighting and other special cases.

The output or production cost of energy is usually about the same for all periods of the day or of the year. When this is not the case, owing to peculiarities of the load curve or other causes, this fact should be taken into account. The cost of energy per kilowatt-hour having been determined, it should be assessed against each class of load. Figure 6 shows the relation between

the production cost of energy and the output of a fairly large steam plant. The line does not pass through zero because certain expenses are necessary whether or not any energy is produced.

The final rate for each class is then made up of the three general items of consumer, demand, and output costs. The manner in which these are put together and the type of rate structure to be chosen for each class will then depend upon special circumstances surrounding each particular location. Considerable leeway should be allowed the management of each utility in the choice of the rate structure to fit the particular installation. The portion of each of these three costs needed for each class of customers or business in the future should be estimated as accurately as possible. This brings into consideration the stability of business. For example, the requirements and load characteristics of residential customers are not affected to the same extent by business conditions as are those for commercial and industrial customers. A utility may be obliged to increase its generating and transmitting facilities during a period of good business and then find later that the industrial and commercial demands have decreased to such an extent that there



FIG. 6.

is considerable spare capacity available. A higher unit charge for these two classes than for the residence customers may thus be justified.

Ten thousand residential customers, each having a maximum demand of 1,500 watts, may contribute no more to the generating station peak than 1,200 commercial customers, because of the greater diversity among residences and the time of occurrence of their maximum demand. Offsetting this to a limited extent is the larger investment in distribution equipment necessary to serve residential customers.

It is seldom advisable to make statewide rates for all utilities connected to the same transmission system within the state on

account of the differences in the customs and characters of each particular community. Differences are made between urban and rural loads, but it is sometimes difficult to determine whether a suburban community should pay urban or rural rates. For closely built-up communities with suburban additions beyond the city limits, it is not possible to differentiate between the customers on one side of the city limits from those on the other either for residence or for power loads. However, strictly rural customers residing beyond the regular primary or secondary distribution system of a city should pay, in addition to the urban charge, excess costs of rendering service to them over that of the urban consumers.

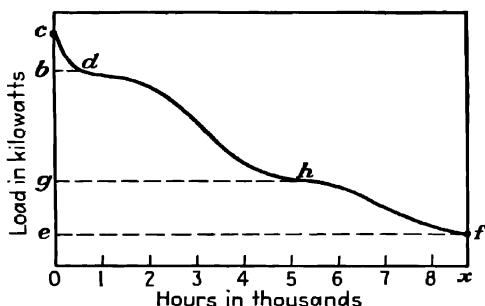


FIG. 7.—Load duration curve.

The allocation of costs for interstate properties is also difficult to make unless the cost of the property in each state is known. Transmission costs may sometimes be allocated by assessing these costs on the basis of miles of line in each state. However, if generating costs in one state are difficult to secure by the commission of another state, the figures furnished by the utility are usually taken as a basis and checked against similar costs within the state where the rates are to be determined. Regulatory bodies of both states often co-operate by supplying each other information.¹

¹ Re Eastern Shore Gas & E. Co. (Md.), P.U.R. 1920E, 244; Moore v. Merchants L. & H. Co. (Ind.), P.U.R. 1916B, 499; Maires v. Flatbush Gas Co. (N.Y. 1st Dist.), P.U.R. 1920F, 930; Re Electric Co. (Wis.), P.U.R. 1922E, 764; Re Milwaukee E. R. & L. Co. (Wis.), P.U.R. 1918A, 798; Fuhrmann v. Buffalo G. E. Co., 3 P.S.C. N.Y. (2d Dist.) 739.

Figure 7 is known as a "load-duration curve." It shows the relationship between the load (in kilowatts) and the number of hours it existed during the year. The area between the axes and the curve represents the number of kilowatt-hours delivered by the power plant to the system. The kilowatt-hours represented by the rectangle *oxfe* required a generating capacity of *oe* kw and represents a 100 per cent load-factor load. This energy costs the least per kilowatt-hour because the demand charge, proportional to *oe*, is divided by a large number of kilowatt-hours. The energy represented by the uppermost portion *bcd* is very small, yet the capacity required is about the same as *oe*. Hence, the unit cost of supplying this energy is many times that of the former.

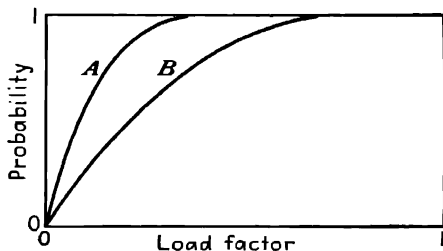


FIG. 8.—Probability of peak responsibility.

Assuming a fixed annual charge of \$18 per kw year and a production expense (coal, labor, maintenance, etc.) of 5 mills per kwh, the average cost in the first instance would be

$$(\$18 \div 8,760) + 0.5\text{¢} = 0.705\text{¢ per kwh.}$$

In the second instance, if only 500 kwh per kw of load is assumed, the average cost would be

$$(\$18 \div 500) + 0.5\text{¢} = 4.1\text{¢ per kwh.}$$

Each component of property (generating station, transmission system, distribution system, etc.) would contribute to the expense in a similar manner so that the difference between the cost of good and poor load-factor business is at once apparent.

On account of the fact that a multitude of poor load-factor customers may result in a fairly good load factor in the aggregate, it would be improper to determine the rates to be charged by considering the individual case of each customer. The amount

that each customer contributes toward the peak load, otherwise known as the "demand responsibility," is more fair, but here again the future responsibility of each customer for the peak load is not known. The probability of each customer's responsibility would be more appropriate. The probability of a customer having lighting only, such as some commercial establishments, is represented by curve *A* (Fig. 8). A power customer using his motors intermittently would be represented by curve *B*. One thing certain (probability = 1) is that a customer with a 100 per cent load factor (constant use throughout the day) is responsible to the extent of his entire load.

Figure 9 represents the relationship between customers' individual peak loads and peak loads of a group of customers in the same class and shows the resultant effect on the station peak

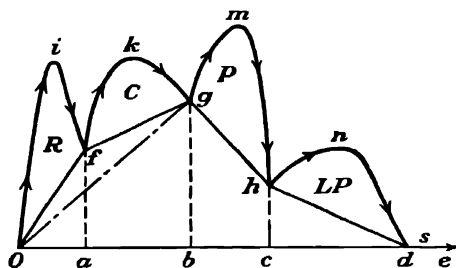


FIG. 9.—Relationship between customers' individual peak loads and the resultant effect on station peak load.

load. The first loop represents residential customers, the distance *oa* being the amount by which these customers are responsible for the station peak load. The line *of* represents the peak load of the residential customers as a group. The loops *C*, *P*, and *LP* represent similar amounts for commercial, small-power, and large-power customers. The distances *ab*, *bc*, and *cd* represent similar contributions to the station peak load as the line *of* projected on the axis (distance *oa*) for residential customers. The portion from *d* to *e* represents street lighting, whose load is on before the station peak and extends over it. The more nearly vertical a vector is, the more "off-peak" the load it represents is. The peak load of the commercial customers is represented by the line *fg*, of power customers by the line *gh*, and of combined light and power customers by the line *hd*. If only the residential and

commercial customers are supplied from the same substation, the peak load of the substation would be represented by the vector og . From the diagram it is seen that the residential customers are responsible for oa/oe of the station peak, commercial customers ab/oe , small-power customers bc/oe , large-power customers cd/oe , and street lighting de/oe . The peak-responsibility method would require allocations of generation fixed charges proportional to these amounts.

Another method of considering this problem would be to add the peak load of each class, *viz.*, $of + fg + gh + hd + de = C$, and then assess the several classes as follows:

$$\text{Residence} = \frac{of}{C} \text{ of total.}$$

$$\text{Commercial} = \frac{fg}{C} \text{ of total, etc.}$$

A third method would be to total all the individual maximum demands as $oif + fkg + gmh + hns + de = T$, and then all customers would have the same allocation per kw.

It was shown that each of the customers is not equally responsible to the extent of his own maximum demand, that the probability of his responsibility increased as his load factor increased, and that the probability was not the same for all classes.

By including a portion of the fixed charges in the energy costs, a customer with a load factor larger than another can be caused to pay a larger demand charge thus giving effect to the probability feature. By having higher demand charges for the class whose probability of contributing to the station peak load is greater, this feature is also taken into consideration.

Types of Schedules. *Straight-line Rate.*—This type of schedule provides for one unit charge regardless of the amount of energy used, *e.g.*,

10¢ per kwh.

It derives its name from the straight line that results when the total bill is plotted on rectangular co-ordinate paper for various consumptions.

Flat-rate Schedule.—This type provides for a certain charge per unit of time (day, week, month, etc.) regardless of whether much

or little energy is used. Examples of flat charges are the following:

- \$24 per hp-year
- \$25 per year for each 100-watt street lamp
- 40¢ per month for each 50-watt lamp
- \$ 5 per kw of maximum demand per month.

By using energy continuously, a customer would, at the rate of \$5 per kw per month, obtain an average of 730 kwh for \$5, or at a rate slightly less than 7 mills per kwh. If he used it continuously for only 8 hr per day for 25 days each month, he would receive 200 kwh at an average rate of 2.5 cents. Such a schedule is particularly advantageous to the "long-hour user."

Step Rates.—By making a specified unit charge for amounts falling between certain limits, another for amounts between other limits, a "step-rate" schedule results. An example of such a schedule is as follows:

- 10¢ per kwh for the first 100 kwh
- 8¢ per kwh for 101 to 200 kwh
- 6¢ per kwh when consumption exceeds 200 kwh.

With such a schedule the cost of 90 kwh would be \$9, whereas by using 20 kwh more the charge would be only \$8.80. The charge for 190 kwh would be \$15.20, and for 210 kwh it would be \$12.60. Such a schedule promotes the wasting of energy. The undesirable features of this type can be eliminated by resorting to the "block-rate" type of schedule.

Block Rate.—In a block-rate schedule, specified rates per unit sold are applied to specified blocks of use. Some examples of such rates are the following:

For power:

- First 5 kw of maximum demand at \$5 per kw per month
- Next 20 kw of maximum demand at \$4 per kw per month
- Excess kw of maximum demand at \$3 per kw per month.

For energy:

- First 75 kwh used per month at 10¢ per kwh
- Next 75 kwh used per month at 8¢ per kwh
- Next 150 kwh used per month at 6¢ per kwh
- Excess kwh used per month at 4¢ per kwh.

The preceding block rate for energy is an improvement over the step rate because of the elimination of the regressive feature.

Under the block rate, the bill for 90 kwh would be \$8.70, for 100 kwh \$9.50, and for 110 kwh \$10.30.

Load Factor or Wright Demand Rate.—This type of rate schedule was first applied by Wright in England when a charge was made dependent upon the number of hours per day a demand was used. The initial rate was based upon 2 hr per day, or 52 hr per average month of 26 working days. It is of the following type:

First 52 hr use of demand per month at 6¢ per kwh
Excess use of demand per month at 3¢ per kwh.

A customer imposing a demand of 10 kw and using 2,000 kwh during the month would pay a bill calculated as follows:

| | |
|-------------------|---------|
| 520 kwh at 6¢ = | \$31.20 |
| 1,480 kwh at 3¢ = | 44.40 |
| Total | \$75.60 |

Hopkinson Rate Schedule.—The Hopkinson type of demand rate was likewise first used in England and consists of two parts, a demand charge and an energy charge. For example,

Demand charge:

First 5 kw of demand at \$3 per kw per month
Excess kw of demand at \$2 per kw per month
plus

Energy charge:

First 1,000 kwh per month at 3¢ per kwh
Next 1,000 kwh per month at 2¢ per kwh
Excess kwh per month at 1¢ per kwh.

The bill for 10-kw demand and 2,000 kwh is calculated as follows:

| | |
|-----------------|------|
| Demand charge: | |
| 5 kw at \$3 | \$15 |
| 5 kw at \$2 | 10 |
| | \$25 |
| Energy charge: | |
| 1,000 kwh at 3¢ | \$30 |
| 1,000 kwh at 2¢ | 20 |
| | \$50 |
| Total | \$75 |

The bill is almost exactly the same as when the Wright demand rate was applied. For larger demands and consumptions, the Hopkinson rate shown above would give a lower bill than the preceding Wright demand rate because of the effect of the lower

charges for demand after 5 kw and energy after 2,000 kwh per month.

Minimum Charge.—The fact that many consumers make but little use of the service causes a loss which some must bear. The utility should be permitted to establish a minimum charge, for each customer costs the utility something beyond the mere amount of energy consumed, such as, for instance, the cost of reading and maintaining meters, the interest on and the depreciation of the meters and services on consumer's premises, the delivery and collection of bills, and the credit that each company extends for a period of 30 to 35 days on each bill. Even with the first step in a block rate as high as 10 cents per kwh, there would be many customers who would use only 20 to 40 cents worth per month. Consumers get more than the electric current, and, if the patron does not pay enough for the service to provide a sustaining rate, then he is not bearing his cost of service. The minimum charge is a minimum consumption charge, as distinguished from a demand charge or service charge, although it may be designed to cover demand costs. A minimum charge is absorbed in the charge for service if the bill amounts at least to the specified minimum.

As a general rule, the minimum charge is preferable to the so-called service charge, where the resulting revenue is practically the same in either case, in view of the popular misunderstanding of the bare service charge. It is designed to equalize the rates between the substantial user and the convenience user of the service. In addition to the amount to cover the items listed in the last paragraph, the minimum-charge portion of the schedule must cover an amount for some consumption of the commodity itself. However, the amount of the minimum charge must not be large enough to make the rate schedule in effect a flat rate for a majority of the consumers. The minimum monthly charge for residential and commercial electric service is \$1 or less except in rural areas where it is greater because of the larger investment per customer in distribution facilities.¹

¹ *Holland v. McGuire* (Mich.), P.U.R. 1920B, 149; *Re Indiana P. & Water Co. (Ind.)*, P.U.R. 1918A, 720; *Re Commonwealth Edison Co. (Ill.)*, P.U.R. 1929D, 305; *Re Brooklyn Union Gas Co. (N.Y.)*, P.U.R. 1931D, 129; *Re New York Edison Co. (N.Y.)*, P.U.R. 1932E, 218; *Re Cambridge E. L. Co. (Mass.)*, P.U.R. 1933D, 113; *Re Pacific Gas & E. Co. (Cal.)*, P.U.R. 1934A,

In the case of water and gas rates, the charge is sometimes graduated in proportion to the size of the outlet or meter for each installation.

Service Charge and Readiness-to-serve Charge.—Each customer causes certain expenses to the utility regardless of the amount of the commodity used or whether he uses any of it at all. There is no justice as between customers in any system of rates that permits him to escape from the payment of that expense and to shift the burden to some other class of consumers. The reason for such a provision is so apparent that it is not necessary to do more than refer to it in a general way. Whether the demand by an individual consumer is great or small during a given period, the utility must be ready at all times to furnish the service in a reasonable manner and to a reasonable extent. This preparedness, this readiness to serve, is worth something to the consumer, whether he makes a request for the service or not. He may not use any of the commodity for a month, but the company and the distribution system are expected to stand ready to serve him. He should, by every principle of equity, be held bound to make a fair return. The utilities have invested large sums in the equipment necessary to render the service, whether demanded or not, during any specified period, and the consumer should, whether he demands the service or not, be prepared to bear a portion of the burden.¹ The cost usually covered by the service charge is upon the basis of the annual expenditure of the utility for the interest, depreciation, and repairs of the property on the consumer's premises and devoted to his individual use. Sometimes an amount is also included to cover a portion of the demand charge for the other equipment of the company, such as fixed charges for transmission lines, transformers, secondary distribution system, etc., of an electrical system.

A service charge is usually considered fairer and more equitable than a minimum charge, because under the minimum charge the

1; *Spector v. The Derby Gas & E. Co.* (Conn. 1936), 13 P.U.R. (n.s.) 128; *Trier v. Eastern N. J. P. Co.* (N.J.), P.U.R. 1929D, 166; *Re Twin State Gas & E. Co.* (N.H. 1934), 5 P.U.R. (n.s.) 388; *Re Wisconsin P. & L. Co.* (Wis. 1936), 14 P.U.R. (n.s.) 1; *Re Consumers P. Co.* (Mich. 1936), 14 P.U.R. (n.s.) 36; *Re Perth Amboy Gas L. Co.* (N.J. 1937), 16 P.U.R. (n.s.) 61.

¹ *Landon v. Lawrence* (Kan.), P.U.R. 1915E, 763.

less current an electric consumer uses the more he pays for having the privilege of using the service whether he requires it or not, whereas under the service charge the cost of having the service available for use is borne equally by all consumers and not entirely by small consumers as is the result of a minimum charge.¹

It has often been urged against the gas service charge, and probably in the beginning against the minimum charge, that these charges are too much of a burden upon those who can least afford to pay, and that any losses that occur by reason of non use of the service ought to be made up by the rich. But the fact is that it is the well-to-do rather than the poor who impose the burden of these losses on the others. It has been shown that the small users of gas are largely business concerns and professional men; and that the small consumption is in homes and apartments of the middle class, where there are only two or three in the family, where there are no children, or the children have grown up and left the home, and where the family goes out for meals or buys partially prepared food and does very little cooking, and in the homes of those more fortunately situated who spend several months of the year away from home with the house closed and consequently with little or no consumption of gas. Experience has shown that it is not the poorer class who usually demand the connection and then fail to use the service, but the well-to-do, who have other means of supply and desire the connection only that they may be prepared for emergencies.—*Re Ashtabula Gas Co. (Ohio)*, P.U.R. 1917D, 790.

Doherty Three-part Rate.—The essential features of a Doherty three-part rate, originally developed and used by Henry L. Doherty, are a consumer charge, independent of the amount of commodity used or of the installation; a capacity charge based upon the demand or the amount of plant that a consumer requires

¹ *Canton v. St. Lawrence Transmission Co.* (N.Y. 2d Dist.), P.U.R. 1920F, 214; *Re City of New London (Wis.)*, P.U.R. 1931E, 369; *Re Wisconsin-Michigan P. Co.* (Wis. 1934), 4 P.U.R. (n.s.) 276; *Little Rock R. & E. Co. v. Newman*, 91 Ark. 89, 120 S.W. 834; *Donnell v. Brockman*, 117 Ark. 132, 173 S.E. 843; *Montgomery L. & P. Co. v. Watts*, 165 Ala. 370, 51 So. 726; *Buffalo v. Buffalo Gas Co.*, 81 App. Div. 505, 80 N.Y. Supp. 1093; *Alabama Pub. Service Comm. v. Alabama P. Co.* (Ala.), P.U.R. 1929A, 459; *Re Brooklyn Union Gas Co. (N.Y.)*, P.U.R. 1931D, 129; *Re Customers of Boston Consol. Gas Co. (Mass.)*, P.U.R. 1931D, 358; *Municipal Gas Co. v. Wichita Falls (Tex. 1935)*, 9 P.U.R. (n.s.) 33; *Re Consolidated Water P. Co. (Wis. 1936)*, 11 P.U.R. (n.s.) 448; *Re Boston Consol. Gas Co. (Mass. 1936)*, 12 P.U.R. (n.s.) 113.

to be maintained in readiness to serve him at any moment in which he might be disposed to call; and an additional charge for commodity used. Originally the scheme included a factor of distance from the plant and the company's loss and investment on the consumer's premises. However, these latter factors were found to make the rate structures too complicated, and they were dropped.¹

Combinations of Preceding Rates.—Some utilities have adopted schedules of rates embodying a number of components of some or all of the foregoing schedules. In some instances, the Wright and Hopkinson types of schedules are combined, as in the following example:

Demand charge:

First 5 kw of maximum demand at \$3 per kw per month

Next 5 kw of demand at \$2 per kw per month

Excess kw of demand at \$1 per kw per month

plus

Energy charge:

First 52 hr use of maximum demand at 4¢ per kwh

Next 104 hr use of maximum demand at 2¢ per kwh

Excess hr use of maximum demand at 1¢ per kwh.

Residence and Commercial Lighting.—In early commission cases these loads were classified together and the same rate was applied to each service. However, in other cases a difference was made, as noted by the Wisconsin Commission in an early case where it was stated that the average residence consumer was a shorter hour user than the commercial; his maximum demand fell at a somewhat later period of the day; he was situated at a greater distance from the generating station, thus requiring more cost for distribution, for maintenance, and for meter reading; and the investment per unit of sale was greater for him.

A distinct change in this situation has been made in recent years by the addition of many appliances in the home, using energy during off-peak hours. This addition of appliances has doubled the average consumption of energy used by residence consumers during the past 10 years without proportionately

¹ State Journal Printing Co. v. Madison Gas & E. Co., 4 Wis. R.C.R. 501; Re Natural Gas Co. (N.Y. 2d Dist.), P.U.R. 1920F, 563; Re Grand Rapids (Mich.), P.U.R. 1923C, 453; Re Carthage Gas Co. (Mo.), P.U.R. 1925B, 517; Re Cheyenne L. Fuel & P. Co. (Wyo.), P.U.R. 1932A, 136; Re Webb City & Carterville Gas Co. (Mo.), P.U.R. 1932A, 378.

increasing the demand of this class. On this account, a division has been made in the rates between these two classes of consumers, the residence consumers receiving the lower rate for more than ordinary use in most communities.

An attempt was made to approximate the demand of residence consumers either by counting the number and size of lamps or the number of active rooms. With the advent of appliances and motor loads in residences, the number of rooms is of much less significance in the determination of the demand, for a range, a water heater (except off-peak storage heaters), a refrigerator, and/or any one of several motor-driven appliances has a much greater effect on the demand for service than the lighting load. For this reason, active-room schedules are no longer looked upon with favor by most state commissions or by utilities themselves. A simple block rate with low "follow-on" energy charges as the use increases is the most popular type of schedule at present and one that lends itself well to promotion of larger use of the service, for with such a rate the greater the amount of energy used, the lower becomes the average unit cost.

"In view of the increasing use of electric energy in the average residence for other than lighting purposes, a rate schedule based on the number of active rooms was held to be obsolete because of the failure to give proper recognition to the changes in the cost of service occasioned by the development of the appliance load." *Re Wisconsin-Michigan P. Co.* (Wis. 1934), 4 P.U.R. (N.S.) 276. "In more recent years the use of a variety of appliances in the home such as flat irons, fans, toasters, sweepers, radios, refrigerators, washing machines, waffle irons, electric plates, stoves, ranges, and water heaters has increased so that at the present time the demand based on the number of rooms is not a true measure of the demand of any customer. Furthermore, the general character of the company's business has changed so that the industrial and commercial load rather than the domestic load is creating the maximum demand on the company's generating and distribution facilities. It is also true that the room type of rate works a hardship on those customers in moderate circumstances living in older houses having many rooms. This is typical of many farm homes where there are unused rooms which are nevertheless taken into consideration when establishing that customer's rate." *Re Detroit Edison Co.* (Mich. 1936), 16 P.U.R. (N.S.) 9.

On the theory that consumer costs will be approximately the same whether service is being rendered in a large or small com-

munity, some companies have adopted a service-charge type of rate schedule consisting of a flat charge and a block rate for energy used. The following is a sample of such a schedule:

Fixed charge: 60¢ per month

plus

Energy charge:

First 50 kwh per month at 5¢ per kwh

Next 50 kwh per month at 4¢ per kwh

Next 50 kwh per month at 3¢ per kwh

Excess kwh per month at 2¢ per kwh.

The following block-rate schedule with minimum charge results in about the same total bill when more than \$1 and is regarded by many persons as preferable:

First 10 kwh or less per month \$1

Next 40 kwh per month at 5¢ per kwh

Next 50 kwh per month at 4¢ per kwh

Next 50 kwh per month at 3¢ per kwh

Excess kwh per month at 2¢ per kwh.

Either of these two types of rate schedule is simple to understand and encourages additional consumption of energy because of the low follow-on blocks of charge. With an operating cost of 1.5 cents per kwh, the utility would secure the amounts shown in the following table to apply toward the demand or fixed charges.

| Monthly use | Monthly bill | | Amount over 1.5¢ | | Amount for demand | |
|-------------|--------------|--------|------------------|--------|-------------------|--------|
| | 1 | 2 | 1 | 2 | 1 | 2 |
| 0 | \$0.60 | \$1.00 | \$0.60 | \$1.00 | 0 | \$0.40 |
| 25 | 1.85 | 1.75 | 1.48 | 1.38 | \$0.88 | 0.78 |
| 50 | 3.10 | 3.00 | 2.35 | 2.25 | 1.75 | 1.65 |
| 75 | 4.10 | 4.00 | 2.98 | 2.88 | 2.38 | 2.28 |
| 100 | 5.10 | 5.00 | 3.60 | 3.50 | 3.00 | 2.90 |
| 150 | 6.60 | 6.50 | 4.35 | 4.25 | 3.75 | 3.65 |
| 200 | 7.60 | 7.50 | 4.60 | 4.50 | 4.00 | 3.90 |
| 250 | 8.60 | 8.50 | 4.85 | 4.75 | 4.25 | 4.15 |

The question to be answered is then, "Is the additional amount received above the 1.5 cents per kwh sufficient to pay the additional fixed charges on the additional equipment necessitated by

the additional consumption?" When the consumption by existing customers increases, the demand usually increases (except in the case of controlled service such as storage water heating), so that, in addition to providing for the extra production cost, the utility must provide larger wires and transformers. The rate per kilowatt-hour for such added consumption must be sufficiently higher than the production expense to pay fixed and operating charges on such added investment. The amount to be allowed is not the same in all instances. In thickly populated areas the situation may require large secondary conductors and a relatively small number of line transformers, whereas in sparsely populated districts it may require more investment in primary conductors and line transformers.

For commercial loads a similar block rate is used but with a larger portion of demand cost applied. To encourage the use of electric signs and window-display lighting, low rate steps may be used for the long-hour off-peak service. In many cases a service charge plus an energy charge is made, either under the Wright or the Hopkinson type of rate structure. A demand meter is then used to determine the maximum demand of each load. In cities where underground service is supplied in congested portions, a higher rate for service is justified from such lines on account of the greater investment involved over that needed for overhead service to residences and commercial establishments outside this congested area.¹

Where the average monthly consumption of domestic patrons of an electric utility was only 26 kilowatt hours, the Commission was of the opinion that consumption should be increased and an incentive provided by a promotional type of rate, with a view to encourage the use of appliances.—*Mayor of Marlborough v. Marlborough E. Co.* (Mass. 1934), 4 P.U.R. (n.s.) 86.

¹ Re Municipal Plant of Evansville (Wis.), P.U.R. 1924A, 831; Re Central Arizona L. & P. Co. (Ariz.), P.U.R. 1922C, 1; Bell Motor Co. v. Public Service Comm. (N.J.), P.U.R. 1915E, 248; Re Milwaukee E. R. & L. Co. (Wis.), P.U.R. 1916E, 113; Shapiro v. Consolidated Gas Co. (N.J.), P.U.R. 1923E, 116; Re Altamont Apartments (Ala.), P.U.R. 1932B, 258; Jaffe v. New York Edison Co. (N.Y.), P.U.R. 1931A, 252; Re New York Edison Co. (N.Y. 1935), 10 P.U.R. (n.s.) 244; Public Util. Comm. v. Oquossoc L. & P. Co. (Maine 1936), 11 P.U.R. (n.s.) 25; Baker Civic League v. Mountain States P. Co. (Mont. 1936), 11 P.U.R. (n.s.) 94.

Water-heating Rates.—The need for hot water from electric heaters at rates comparable with those charged for other means of heating water presented quite a problem to the electrical industry. Hot-water requirements of the average family are such that to supply them by means of electric service requires a rate in the neighborhood of 1 cent per kwh. Reflection will immediately lead one to the conclusion that this rate can be met only when this service is controlled as to hours of operation, so that as little additional equipment as possible is installed by the utility to supply this service. By disconnecting the heater during periods when the peak load is apt to occur in the generating station and transmission systems, the installation of additional facilities in either of these two components of property can be reduced to a minimum. Also, by keeping the water-heating elements as small as possible, the probability of water-heating loads necessitating increases in distribution equipment can be minimized. This need has led to the adoption of low-wattage storage-type heaters where the storage tanks are sufficiently large to take care of the customer's daily requirements, thus permitting the heating elements to operate during a large number of hours daily. To accomplish this purpose, the rate schedule should contain a minimum bill provision that will make it an incentive for the customer to install a heating element no larger than necessary to supply his hot-water requirements.¹

Such rates have not been approved in all districts of the country, objections being made to the selection of a particular purpose rate without applying the same rate to other loads, as shown in the following:

"It was asserted by the petitioners, and not answered by the company, that if the company could properly sell electricity under this rate for water-heating purposes, it could sell it for all other purposes under the same terms. We are not prepared to find this so, as there may be factors involved in length and uniformity of use which do not apply to other uses. Moreover, we have some doubt as to the rate returning sufficient profit to warrant its extension." *Re Customers of Edison*

¹ Herrmann, R. R. and K. R. McClung, "Residential Water Heating," *Elec. World*, Vol. 91, No. 7; Herrmann, R. R., "Some Mathematical Aspects of Electric Water Heating," *Electric Light & Power*, Vol. 8, No. 1, and Vol. 8, No. 2; Herrmann, R. R., "Water Heater and Range Produce Satisfactory Load," *Elec. World*, Feb. 12, 1938.

E. Ill. Co. (Mass. 1934), 5 P.U.R. (N.S.) 369. "Rates should not arbitrarily differentiate between the purposes for which electricity is being used at a given time." *Re New York State E. & Gas Corp. (N.Y. 1935)*, 6 P.U.R. (N.S.) 113.

Power Rates.—In small cities all power loads are often placed in the same classification. In larger cities these loads may have several different classifications according to their special characteristics.

Power is usually used before the late afternoon peak load, although some power loads may continue into the daily peak period or even contribute heavily to the peak load on the system. Whereas, most residential and commercial lighting loads have nearly unity power factor, power loads may have low power factors on account of the use of induction motors and other low-power-factor equipment. The kilovolt-ampere demand is equal to the actual kilowatt demand divided by the power factor. Since it is the kilovolt-ampere demand that limits the output of the generating station and causes the losses in the distribution system transformers and generators, it is of advantage to the utility to have these power factors improved as near the load centers as possible. Power factor may be increased by installing capacitors and by using synchronous motors instead of induction motors. Since the utilities cannot very well compel the installation of any particular kind of motor, except for limiting the starting-current surges on the system, it is usual practice to induce the customer to install such devices by the use of power-factor clauses in the power rate schedule. Such clauses fix a power factor, such as 80 per cent, as a standard, imposing a penalty for poor power factor and sometimes giving a bonus for all power factors greater than this standard. By this means, a customer may save in a very short time a sufficient amount in operating costs to pay for the installation of the special power factor improving equipment.

There are several ways by means of which the power-factor element may be embodied in the rate schedule, and, as in nearly all engineering problems, the method adopted is a compromise between several conflicting elements. The maximum demand in kilovolt-amperes can be measured, but this requires rather expensive metering equipment. The power factor of a single-phase load is defined as the quotient obtained by dividing the load in watts by the product of volts and amperes taken by

the load. A similar definition holds for polyphase power. Instead of measuring the kilovolt-ampere-hours, it is much easier to measure the "reactive" kilovolt-ampere-hours. With a steady load, the relationship among kilowatt-hours, kilovolt-ampere-hours, and reactive kilovolt-ampere-hours is expressed by the following formula:

$$\text{Kva-hours} = \sqrt{(\text{kilowatt-hours})^2 + (\text{reactive kva-hours})^2}$$

By recording each of the two factors under the square-root sign for each 15-min interval, the maximum demand in kilowatts and in reactive kilovolt-amperes can be determined. With a fluctuating load and power factor, the maximum reactive kilovolt-ampere demand may not occur at the same time as the maximum kilowatt demand so that the maximum kilovolt-ampere demand is not necessarily obtained from the preceding formula. By charging for reactive kilovolt-ampere-hours, customers with poor power factor and using the same demand in kilowatts and number of kilowatt-hours as another having good power factor will pay a higher bill. There will thus be a tendency for customers to improve their power factors. The quotient obtained from the formula

Kilowatt-hours

$$\sqrt{(\text{Kilowatt-hours})^2 + (\text{reactive kva-hours})^2}$$

is sometimes referred to as the "average power factor" for the period of time (hour, day, week, or month) during which the measurement is taken. Some rate engineers contend that the power factor at the time of the customer's maximum kilowatt demand is the proper one to use in the rate structure. With a fluctuating load and power factor varying from hour to hour, the maximum kilovolt-ampere demand may occur at a time when the customer's kilowatt demand is only a portion of his maximum. Also, good power factor at all times is most beneficial to the utility. Therefore, it appears to the authors that a rate schedule which induces the customer to operate at a good power factor at all times is the most desirable. Basing the charge on the power factor existing at the time of the customer's maximum demand induces him to neglect it at other times and, hence, is not so desirable. A charge may be made for reactive kilovolt-ampere-hours, and, if all customers operated at the same load factor, such

charge would be equitable as between customers. But, when some customers operate their equipment much fewer hours than others, they would pay much less for the kilovolt-ampere demand caused by poor power factor even though they might be imposing the same additional expense as long-hour users, and for this reason such a basis is not equitable.

A difference is also sometimes made between the charges for what is called "firm power" and "dump power." By firm power is meant that portion of the power output of a station or system which is to be guaranteed and furnished at all times on demand of the customer, whereas dump power is excess power, particularly that furnished from hydroelectric plants by water that would otherwise be wasted, and its supply is limited to such times only. The utility can afford to take much less for this dump power, for otherwise it would lose the income from the sale of this amount of energy. A utility cannot guarantee to furnish this energy at any particular time, and the customer must have a use for such energy at the time it is available.

In most utilities in the northern area, the maximum load occurs on the station and system during the winter months, and it is less during the summer months. This is due to the greater demands for lighting during the winter and somewhat to seasonal demands for power by industries connected to the system. On the other hand, office and apartment buildings having their own power plants have a need for their exhaust steam for heating purposes during the winter months, so that the electricity used by them during that time is more or less a by-product of their heating load. In the summer these plants do not need to supply steam for heating; therefore, the generation of electricity is no longer a by-product, and it costs them more to produce it than it does in winter. This situation has given rise to special rates for summer service for such loads, which thus help the utility to employ equipment that otherwise would be idle. Such installations and others may have a connection with the utility for "breakdown," or emergency, service at any time but at a higher rate than for similar summer service. This higher breakdown rate for emergency service is justified by the fact that these installations are really competing against the utility by furnishing their own supply except in emergency. It is not the amount of energy used but the potential demand of such loads that counts

in the same manner as the water service to municipal or private fire hydrants from a water system.

The kind of rate schedule best adapted for large power loads is usually a two-part rate of the Hopkinson demand type. The service charge of such a rate is usually made applicable on the yearly demand basis or on the monthly basis with a "demand ratchet" provision that limits the demand billed to not less than a certain percentage of the previous maximum. That is, it is determined as the maximum demand for any 12 months, rather than for the month in which the demand is made, or for the month with a limitation downward on a 12-month basis. In this manner the utility is protected wholly or in part against seasonal changes in the demands of such customers. The demand is

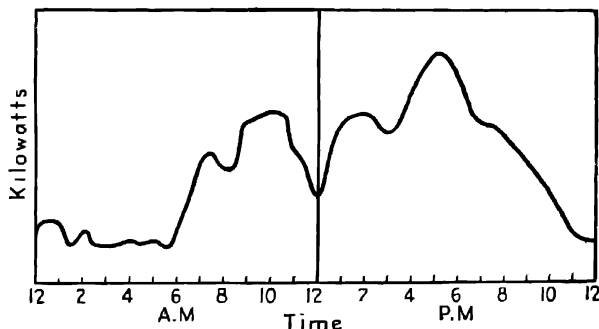


FIG. 10.—Load curve of a small city.

determined either by indicating or by curve-drawing meters. The latter method is preferable for large loads, for it gives the utility additional information as to the load curve of the customer, including the time of day when the demand is made, as a help in determining future rates for such service. For smaller power loads, indicating demand meters may be used, or else the customer's demand may be agreed upon from the connected load of the customer and knowledge of the load curves of similar types of installations. In some cases a combined lighting and power rate is made for power customers, when the relative amount of the lighting to the power demand is small. Such combined rate is higher than for the power rate alone but less than the usual commercial lighting rate.

Power users taking energy during strictly off-peak hours are entitled to receive the lowest rates. Such service may include ice making, water pumping where a large storage capacity is available which can be utilized during peak periods, battery charging for electric vehicles during night periods, and other similar uses for energy. In such cases, some form of time switch is usually used for small loads and a curve-drawing meter for heavier loads, so as to determine the demand during both the

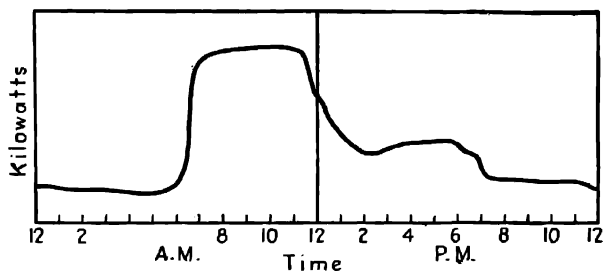


FIG. 11.—Load curve of a rubber-processing plant.

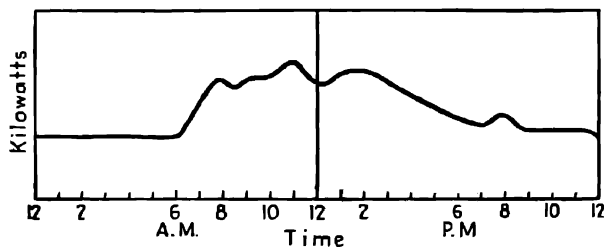


FIG. 12.—Load curve of a meat-packing plant.

off-peak and on-peak periods. Water heating for residences is sometimes classed in this category and sold at a very low figure. Figures 10 to 14 show demand curves obtained on typical power loads. Special attention is called to the steady load of a flour mill and to the time of the peak load of a creamery, the irregular curves from 6:00 P.M. to 7:00 A.M. being caused by refrigerating equipment. In Fig. 5A is shown a load curve of a substation supplying an industrial district in a large city.

Load Factor and Demand.—As explained previously, the individual maximum demand of a customer may occur at some time

when the station load is not at its peak. The chances of a customer's maximum demand occurring at the same time as that of every other customer are extremely remote. Even in the case of lighting loads, where one would expect little or no diversity because of darkness creeping over large areas at the same time, there is some variation. Equipment, such as refrigerators, operating by means of controls independent of human activity, where the probability of the load occurring at any particular time

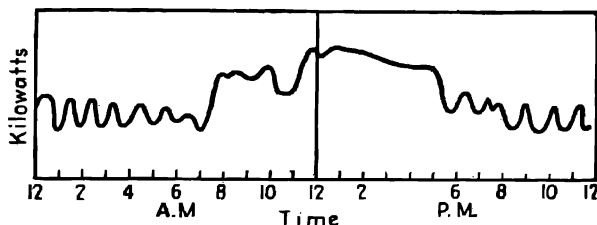


FIG. 13.—Load curve of a creamery.

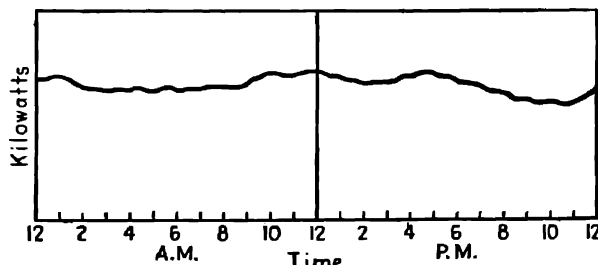


FIG. 14.—Load curve of a flour mill.

is as great as at any other particular time, has a diversity factor that is the reciprocal of each individual load factor. For example, if a large number of refrigerators of the same size and make are each operating at a 25 per cent load factor, the maximum demand of the group would be one-fourth of the sum of all; hence, there is a diversity factor of 4 to 1 for the group. Equipment operating continuously would have no diversity, either among the individual units of such equipment or between each unit and any other equipment of any kind whatever. This leads one to the conclusion that as the load factor of individual users increases the diversity factor between them decreases.

The probabilities of the maximum load occurring at any particular time and of it occurring at the same time as other loads are very important elements in determining the charge and type of schedule to apply to the particular kind of business served. Generally speaking, equipment operating eight or more hours per week day should pay full demand charges. This situation can most readily be accomplished by two schedules: one having small or no demand charges and high energy charges and the second, high demand charges and low energy charges, and which schedules are optional to each other. Small-load customers, where the probability is small of their maximum demands occurring at the same time as that of the station peak load, would be served under the first schedule and large load-factor customers on the second. One single schedule to take care of both situations might be devised, but to do so would result in a rather complicated schedule, especially when consideration is given to the amount of energy used as well as to the load factor.¹

Objective Rates.—It was pointed out previously that the average cost per kilowatt-hour is very closely associated with the average use, being much lower with large consumption than with small. Lower prices charged consumers are an incentive to larger consumption, so that, to accomplish the greater average use, some means is desirable of charging a low rate for additional use without introducing a very low rate for all use. To introduce a low rate for all at the same time would result in an immediate serious loss to the utility. To overcome this feature, "objective" and "crossover" rates were adopted in some states, the main feature of these rates being the charging of a very low rate for all additional consumption over the amount than during the same

¹ *Re Milwaukee E. R. & L. Co. (Wis.)*, P.U.R. 1918A, 798; *Ketterlinus v. Bar Harbor & U. R. Co. (Me.)*, P.U.R. 1920B, 513; *Re Colorado P. Co. (Colo.)*, P.U.R. 1922D, 800; *Bureau of Lighthouses v. Southern Pub. Util. Co. (N.C.)*, P.U.R. 1928E, 307; *Re United R. & E. Co. of Baltimore*, 7 F. Supp. 265 (1934), 4 P.U.R. (N.S.) 142; *Consumers v. Edison E. Ill. Co. (Mass.)*, P.U.R. 1926A, 525; *Re California-Oregon P. Co. (Ore.)*, P.U.R. 1924E, 505; *Re Consolidated Water P. Co. (Wis. 1936)*, 11 P.U.R. (N.S.) 449; *Re Reedsburg Util. Comm. (Wis.)*, P.U.R. 1924C, 290; *Re Cedarburg (Wis.)*, P.U.R. 1927B, 630; *United Charities Building v. New York Edison Co. (N.Y. 1935)*, 10 P.U.R. (N.S.) 53; *Re Commonwealth Edison Co. (Ill.)*, P.U.R. 1929D, 305; *Re Wisconsin P. & L. Co. (Wis. 1936)*, 14 P.U.R. (N.S.) 1; *Kansas City P. & L. Co. v. Cirese (Mo. 1936)*, 11 P.U.R. (N.S.) 375; *Re New York Edison Co. (N.Y. 1937)*, 16 P.U.R. (N.S.) 120.

month of the previous year for each customer, and when the additional consumption was such that the bill, if calculated on the objective rate, was the same or greater, the objective rate was used. This scheme involves a base consumption from which to work and to which to add, an objective rate that would be applicable if certain conditions were met, and a crossover rate to be used in charging for the energy in excess of the base consumption. This plan can be made clearer by referring to Fig. 15. Suppose that a customer during a certain month of the past year used an amount represented by OA and paid an amount represented by

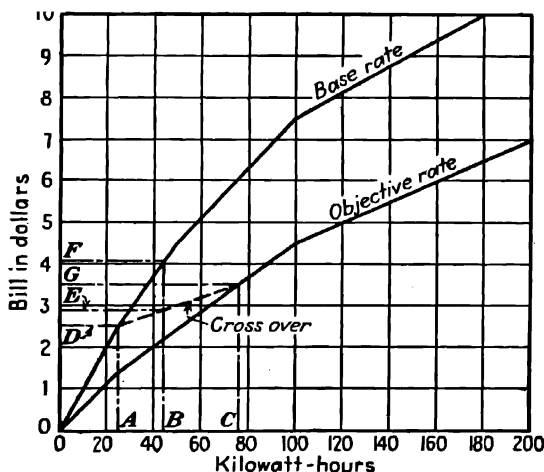


FIG. 15.—Base, objective, and crossover rate curves.

OD. During the same month of the present year, his consumption was equal to OB . If billed on the base rate, *i.e.*, last year's rate, his bill would be OF , but by charging a lesser amount for the additional use, his bill is only OE . If he has used an amount equal to OC , his bill would have been OG , and for greater amounts he would be billed on the objective rate. This method, although commendable in many respects, is discriminatory and also very expensive to calculate and bill; hence it has had a very short life.

Fuel Clauses.—Following the World War, the prices of coal rose to extremely high levels, and a great many power companies, because of contractual obligations previously entered

into, were obliged to continue service on prewar rates. This led to a more general introduction of "fuel clauses" in contracts where an adjustment in the average rate either upward or downward was to be made when the average cost of fuel to the utility was above or below a specified base cost.

If the cost of coal is \$4 per ton and the heating value is 14,000 Btu per pound, the cost per million Btu is 14.2 cents. Assuming the power plant efficiency is such that 18,000 Btu are required to generate 1 kwh, the fuel cost becomes 0.2556 cent per kwh. If the cost were 15.2 cents per million Btu, the fuel cost would become 0.2736 cent per kwh—0.018 cent more. A fuel clause to compensate for this would be worded so that for each 1-cent increase or decrease in the cost of 1,000,000 Btu above or below the base cost of 14.2 cents per million Btu the average rate would be increased or decreased 0.018 cent (0.18 mill) per kwh. If the losses in distribution and transmission are considered (as they should be), the amounts would be increased proportionately.

Most small consumers would find it difficult to understand the operation or justice of a fuel clause. The fact that coal-clause adjustments have appeared on residential bills for a number of years was not considered sufficient to establish the wisdom of their inclusion in new rate schedules. All things considered, a Btu basis is more satisfactory than the basis of price per ton. Objection to the Btu basis was made upon the ground that it is less easy for customers to understand and for the commission to check. The practical effect of a change to a Btu basis would be negligible. Nevertheless, the proposal is theoretically more satisfactory, not difficult to administer, and likely to operate satisfactorily in case the company should find it economical to use different grades of coal or other kinds of fuel.—*Re New York Edison Co. (N.Y. 1935)*, 10 P.U.R. (N.S.) 244.

Temporary Rates.—Some states have enacted laws permitting their commissions to prescribe temporary rates pending the establishment of a new rate base. After such determination of the new rate base has been made, the commission is empowered to make new permanent rates, a provision being made in the latest laws to reimburse the company for any losses under the temporary rates. Before this reimbursement provision was enacted, the courts declared such laws unconstitutional. Later cases have approved the reimbursement type of laws. The New York Supreme Court at first reversed the commission, but this

ruling was also reversed by the Federal Court, the latter being reversed by the United States Supreme Court. A similar action was taken in connection with the Pennsylvania law.

"The court after discussing decisions of the question of fixing rates to offset past losses, declared that the rule had been established that *nunc pro tunc* orders are not an adequate remedy for losses suffered before the entry of the order. Loss occasioned to the company by fixing an illegal rate base for temporary rates may not be compensated by fixing rates in the future in excess of the current legal requirements." *Yonkers E. L. Co. v. Maltbie* (1936), 12 P.U.R. (N.S.) 26. This decision was reversed by the Appellate Division which held that "a statute is to be construed as providing that the consumers or the public shall make good to the company any loss which it may sustain in temporarily exacting too little. Thus the company, by being permitted to make up any loss sustained under the temporary rates, would not be unconstitutionally deprived of its property." *Bronx Gas & E. Co. v. Maltbie*, 271 N.Y. 364, 3 N.E. (2d) 512 (1936), 14 P.U.R. (N.S.) 337.

In the Pennsylvania case, the Federal Court granted an injunction against the enforcement of a temporary rate order of the commission in *Edison Electric Light Co. v. Driscoll and Pub. Util. Comm. of Pa.*, 21 F. Supp. 1, 25 F. Supp. 192 (1938), 25 P.U.R. (N.S.) 441. This was reversed by the Supreme Court in *Driscoll v. Edison Light & Power Co.*, 59 Sup. Ct. 715 (1939), 28 P.U.R. (N.S.) 65, Apr. 17, 1939.

Street Lighting.—It has been customary in most cities to establish a rate for street lighting according to the size and type of lamp and fixture used for each installation. Such service is mostly for long-hour use; so a special rate favorable to this class of service is justifiable. The schedules of operation are different in various cities and in separate localities of the same city. These may vary from "all-night-and-every-night" to "moon-light-and-midnight," the former taking about 4,000 hr of operation per year and the latter somewhere between 1,000 and 2,000 hr. This service requires longer hours of use in the winter months when the days are short than it does in summer. Instead of unit charges, this service is sometimes placed on a three-part schedule, made up of the following items: one part covering the investment costs, the second part covering the renewal and maintenance costs, and the third part covering the energy used by the whole service. This method allows the municipality

greater flexibility in operation of the lamps, but it may reduce safety of the streets at night when cities run short of funds and reduce expenses by curtailing street lighting in the early morning and evening. This danger is sometimes prevented by embodying adequate minimum charges in the rate structure. In unincorporated communities, street-lighting cost is sometimes paid for by a surcharge on the lighting rates of the residential and commercial consumers.¹

Rates for Resale Purposes.—When electrical energy is sold to municipalities or to private companies who in turn sell it to others, the transaction is usually referred to as "resale." The characteristics that distinguish such service from others, such as the supply of power and lighting to ordinary or ultimate consumers, are the following:

1. The lack of diversity among such customers and also between the resale customer and the supplying utility. Although there are instances where the time of the peak load of the resale customer may be in the morning and that of the supplying utility in the afternoon, yet, generally, such instances are the exception rather than the rule. Since this situation exists, there is of course the necessity to allocate full demand charges against such a customer.

2. Such customers are potential competitors of the supplying utility; they may not actually take business away, but their activities may be such as to cause action on the part of the supplying company which would not otherwise be taken.

3. Since such resale customers are engaged in the same kind of business as the supplying company, the general or common expenses having to do with the production and transmission of power should be allocated to such customers on a proportionate basis.

4. The ceiling of charges for resale service is the expense that such a customer believes he will incur by installing a generating plant and supplying his own requirements, taking into consideration the probable increase in load in the future and spare generating capacity necessary to give reliable service.

¹ *Re Midwest P. Co. (N.D.), P.U.R. 1922E, 22; Re St. Joseph R. L. & P. Co. (Mo.), P.U.R. 1924B, 801; Re City of Oconto Falls (Wis. 1936), 14 P.U.R. (N.S.) 237; Public Util. Comm. v. Duquesne L. Co. (Pa. 1937), 20 P.U.R. (N.S.) 1.*

5. Other services are available to such customers which are difficult to evaluate, such as (a) assistance in time of emergency, (b) assistance and advice in the conduct of their business. The employees of the utility supplying the energy are available to assist in rebuilding lines after a windstorm, to test transformers and oil, to test meters, etc., and even though a charge is made on a time and material basis, such resale customers are spared the overhead expense that is necessary to keep men, material, and equipment on hand to function at a moment's notice. All these factors lead one to the conclusion that a rate schedule for resale purposes should be higher than for industrial purposes and that it should be a two-part rate having demand and energy charges.

Rural Rates.—Two general cases arise in connection with service to rural customers. The first is the rate paid for service over lines built, operated, and maintained entirely by the utility; the second is for service over lines paid for by the customers but maintained and operated by the utility. The charge must be higher for the first of these services by the amount of interest on money invested by the utility. In any case, the rural rates should be higher than those effective in the nearest urban community from which the energy is supplied, by the amount of the additional operating expenses and fixed charges that result from the greater investment and operating expense per customer supplied from the rural line above the cost of producing the energy and delivering it within the city limits. The additional operating expenses come about from greater line and transformer losses, greater cost of meter reading and collection of bills, and other items. The fixed expense for such lines is usually a much greater portion of the total charge than in the case of urban residence service.

A newer form of rural service is that of furnishing energy wholesale to rural co-operative lines, constructed under the Rural Electrification Administration Act. This service is so new that it has hardly had time to establish its true classification. Some items to be considered in this connection are points of connection of the service; capacities available by the utility for furnishing this service; possible reinforcement necessary for the company's lines; contract terms as to duration, payment, and other matters; credit risks; insurance protection necessary if not sufficiently covered by the co-operative; territorial agreements as to territory

partly covered by the utility in the same rural field; and other features that have a bearing on the rates to be charged. So far, the amounts of lighting and motor loads of such installations as well as other pertinent information are not yet known, so that the determination of a schedule relatively correct is rather difficult, unless consideration is given to all factors that may be involved, some of which may be abandoned at a later date. The Kentucky Commission (*Re Wholesale Rates to Rural Cooperatives*) has cited as a justification for special consideration the social advantages that will accrue to the public generally by furnishing such service to the farmers in the trade territory of the urban plant supplying the power to these lines.

The problem of the rate to be charged customers served from such lines is not yet entirely solved. Added to the cost of energy at the terminal of the line covered by the charge made by the utility must be the interest and depreciation on the investment in the line equipment; the sum to be set aside to refund the amount loaned by the Federal government for construction of these lines; maintenance of the lines and equipment; taxes, reading of the meters, bookkeeping, billing, and collecting; and general expenses of administration. The type of construction is such that no definite prediction can be made as to its depreciation and maintenance, for the spans used for transmission are much longer than generally employed for rural lines previously constructed by utilities. The rate schedules advocated and already adopted in a number of instances contain high monthly service charges concealed in the form of a high minimum bill, followed by energy charges as low as possible, in order to induce the liberal use of energy for motors and household appliances.¹

¹ *Re Greenwood-Loyal Joint Transmission Line (Wis.)*, P.U.R. 1924A, 759; *Re Interstate L. & P. Co. (Wis.)*, P.U.R. 1931E, 47; *Re Davis Mill & E. Co. (Wis.)*, P.U.R. 1932A, 478; *Re Marysville E. L. & P. Co. (Mo.)*, P.U.R. 1932B, 364; *Public Util. Comm. v. Mars Hill E. Co. (Me. 1936)*, 11 P.U.R. (N.S.) 40; *Re Consolidated Water P. Co. (Wis. 1936)*, 11 P.U.R. (N.S.) 449; *Re Wholesale Rates for Power to Rural Cooperatives (Ky. 1937)*, 19 P.U.R. (N.S.) 22; *Re Broad River P. Co. (S.C. 1936)*, 11 P.U.R. (N.S.) 66; *State Rural Electrification Coordinating Comm. v. Lake Superior Dist. P. Co. (Wis. 1937)*, 16 P.U.R. (N.S.) 238; *State Rural Electrification Coordinating Comm. v. Wisconsin Gas & E. Co. (Wis. 1937)*, 17 P.U.R. (N.S.) 31; *State Rural Electrification Coordinating Comm. v. Northern States P. Co. (Wis. 1937)*, 17 P.U.R. (N.S.) 124.

The rural customers are a class to themselves, and when served from one interconnected system of transmission lines they should receive the service under rates and rules as nearly alike as possible. Electric rate schedules applicable in rural territory should provide for differentiation in the various classes of customers served so as to recognize the distinction between purely rural or farm customers, business or commercial customers, and industrial customers located along highways in rural territory.—*Public Service Comm. v. Missouri P. & L. Co.* (Mo. 1935), 10 P.U.R. (N.S.) 8.

Special and Miscellaneous Rates.—Special space-heating rates have been tried by utilities having excess capacity in hydroelectric plants particularly on the Pacific Coast and in Canada where fuel costs are relatively high. At first, in order to build up the load, flat rates were used based upon the space to be heated without any check on the amount of energy used by each customer. Later, when the power and lighting load was built up and a shortage of power was faced by the utilities, it was necessary to adopt meter rates to limit the waste of energy for such uses. At present, new rates are being devised for such service on the basis of off-peak use of energy and the storage of heat either in hot-water installations or in hot-air and air-conditioning equipment. It is hoped that these rates will induce the use of considerable blocks of energy from the available supply of hydroelectric power, particularly in regions of moderate climate where too large a heat storage is not required.

Special heat-treating and annealing furnaces as well as furnaces for the production of metallurgical and other materials are given special rates from sources of power where the cost of production of energy is sufficiently low to permit it. Such operations grow up around hydroelectric installations and steam power plants where the fuel cost is relatively low. Such uses of energy take large blocks of power for long periods of time so that they form an almost continuous base load on the plant for each 24 hr. Similar loads are found in ice-making and cold-storage plants in various parts of the country, especially in the southern states. These loads have the advantage of being lighter in the colder months and heavier in the summer.

Special-purpose rates were formerly applied to cooking, refrigerators, and small motor loads for residence uses. This required the installation of separate meters for these services and

for lighting and small appliances. The double meter installation cost the utility more than necessary; so new rates were adopted with lower charges for the "follow-on" blocks. The use of such appliances has been encouraged still further by the use of promotion, optional, and objective rates. The results of such action, together with the active campaigns for the sale of appliances, have produced remarkable results in building up the energy output of most central stations even during the period of the recent depression, when other uses of energy dropped off. This increase of output was made with very little increase in additional investment in new equipment because of the improvement in the load factor of residential loads.¹

¹ *Carvel v. Globe L. & P. Co.*, 2 *Ariz. C.C.R.* 101; *Re Garfield E. Co.* (Wis.), *P.U.R.* 1927B, 199; *Trierv. Eastern N. J. P. Co.* (N.J.), *P.U.R.* 1929D, 166; *Illinois Commerce Comm. v. Rockford E. Co.* (Ill.), *P.U.R.* 1929E, 498; *Re Public Service Co. of Indiana* (Ind.), *P.U.R.* 1932B, 196; *Re Georgia P. Co.* (Ga.), *P.U.R.* 1929B, 309; *Re West Coast P. Co.* (Ore. 1936), 11 *P.U.R.* (n.s.) 70; *Re Malden E. Co.* (Mass.), *P.U.R.* 1928D, 856; *Re Alabama P. Co.* (Ala.), *P.U.R.* 1929A, 458; *Re Consumers P. Co.* (Mich. 1936), 14 *P.U.R.* (n.s.) 36; *Re Manchester E. Co.* (Conn.), *P.U.R.* 1933B, 262; *Re Alabama P. Co.* (Ala. 1934), 3 *P.U.R.* (n.s.) 355; *Noven v. Consolidated Edison Co.* (N.Y. 1937), 19 *P.U.R.* (n.s.) 378; *Re Colby* (Wis.), *P.U.R.* 1924E, 366; *Devils Lake Steam Laundry Co. v. Otter Tail P. Co.* (N.D.), *P.U.R.* 1928C, 83; *Re Edison Saulte E. Co.* (Mich. 1937), 16 *P.U.R.* (n.s.) 63; *Re California-Oregon P. Co.* (Ore.), *P.U.R.* 1924E, 505; *Patrons v. Washington Water P. Co.* (Wash.), *P.U.R.* 1928A, 122; *Re New York State E. & Gas Corp.* (N.Y. 1935), 6 *P.U.R.* (n.s.) 113; *Re New York Edison Co.* (N.Y. 1935), 10 *P.U.R.* (n.s.) 408; *Re Wisconsin Pub. Service Corp.* (Wis. 1935), 7 *P.U.R.* (n.s.) 1; *Mayer v. Illinois Northern Util. Co.* (Ill.), *P.U.R.* 1928A, 529; *Re United E. L. & P. Co.* (N.Y. 1935), 7 *P.U.R.* (n.s.) 38; *Pub. Util. Comm. v. Oquossoc L. & P. Co.* (Me. 1936), 11 *P.U.R.* (n.s.) 25.

CHAPTER XXIII

RATES FOR OTHER UTILITIES

Gas Rates. *General.*—Gas has been furnished to customers longer than most other utility services. The first gas was made from soft coal by the distillation process in much the same manner as is used at present for the same commodity. No standards were set and no fixtures were available for its use either for illumination or for heating purposes. Later it was found that certain deleterious materials, such as ammonia, coal tar, sulphur, and moisture, produced in the high-temperature distillation of the gas, must be removed before introducing the gas into the pipes or mains. The quality of the gas varied greatly according to the method of manufacture and the type of coal used in the process. Standards were set up by different governmental agencies for measuring the quality of this gas and fixing the price to be paid on the basis of quality and quantity used. Later water gas was produced by a different process and from different and lower grades of coal. It was found necessary to introduce different ingredients into this gas to control its quality.

The by-products of the production of the gas were found to be valuable. The coke was salable as fuel for iron and steel production and for heating purposes. The ammonia was removed from the ammoniacal liquors and sold in commerce, and the coal tar was found to be the source of valuable derivatives for chemicals and dyes. Later, natural gas was discovered and began to be used not only for illumination but also for heating purposes.

The original standard for manufactured gas was set at 16 candle power from an open-flame burner of special design when burning gas at the rate of 5 cu ft per hour. No standard of heating quality was specified, for little use was made of the gas for this purpose. With the introduction of the mantle burners for the purpose of illumination, the heating value of the gas was more valuable for this new burner than the former illuminating

quality. For this reason, standards were set up which recognized this heating value of the gas for mantle burners, stoves, and commercial heating devices. A mantle burner gave off 30 to 45 candle power of light when consuming only about 3 cu ft of gas per hour of the new heating quality of 500 to 600 Btu. The natural gas was found to have close to 1,000 Btu per cubic foot but to be of poorer quality for illumination from an open-tip burner. During the World War, it became necessary to reduce the heating quality of manufactured gas to conserve the fuel supply for industrial uses and transportation. The present standard for manufactured gas is about 500 Btu, which figure gives a better over-all economy for use and production.

When straight natural gas is used directly in a distribution system formerly supplied with manufactured gas, the natural gas must be treated with oil and steam to saturate it with both oil and water vapors so as to prevent the drying out of joints in pipes and meter diaphragms and also to odorize it so that it can easily be detected in case of leaks.

In changing from manufactured to natural gas, the utility must determine the probability and duration of interruptions in the supply, such interruptions being serious in the gas business. Cessation of supply means that the service valve at each customer's meter must be closed before gas service is again restored, and when reopened all pilot burners must be relighted and all automatic gas-burning equipment examined to make certain that it is functioning properly. The amount of natural gas used in any community is usually much more than the amount of manufactured gas formerly used; so the supply of gas in holders would soon be exhausted in case of complete cessation of supply. Small cities receiving their supply from long transmission lines can be served adequately for a period sufficiently long to make repairs and to restore the supply, by drawing on the gas contained in the transmission pipe line, which is under very high pressure and therefore represents a much greater volume at ordinary distribution pressures. Large cities cannot depend on one pipe line and must therefore provide other means of assuring themselves of an adequate supply in case of emergencies. By mixing the natural gas with manufactured gas, a mixed gas of heating quality somewhere between that of the two constituents is obtained, and, in an emergency, manufactured gas of the high

quality can be supplied for a short period. By introducing a high-grade oil into manufactured gas, its heating value can be raised to 800 Btu per cubic foot quite easily but not without considerable additional expense in manufacture.

The present use of gas is mainly for heating purposes such as cooking, house heating, and industrial processes, although the gas refrigerator is not to be overlooked and is a very desirable load to obtain. Gas is also used in some localities for air conditioning in the summer time in the "silica-gel" process. The humidity of the air is lessened by passing it over cooled silica gel, thus making for greater comfort. When the silica gel has absorbed all the moisture that it can, it is heated by means of gas which drives off the moisture. After cooling, the silica gel is again ready to repeat the cycle. Two beds of silica gel are thus necessary, one being heated and allowed to cool while the other is used to remove the moisture of the air passing over it.

Apportionment.—Before proceeding to the problem of fixing rates for gas service, the property must first be valued according to some of the methods approved by courts and commissions, as discussed under valuation. The operating expenses and fixed charges must also be determined ready for apportionment among the different divisions of cost. Where several municipalities are served from a common transmission line by an intercorporate related company, the common transmission system costs must also be allocated among the different cities on some equitable basis. Such allocation is frequently made on the basis of the gas used by each municipality. The propriety of considering such costs was discussed under valuation and expenses, where it was found that the state courts and the Supreme Court had ruled that such costs must be determined and proper allocation must be made.

Within a given municipality, allocation must be made of the value of the property among production, storage, and distribution: production equipment including land, buildings, and machinery; storage facilities including holders; distribution including high- and low-pressure mains, services, and meters.¹

¹ Re Illinois Northern Util. Co. (Ill.), P.U.R. 1920D, 979; Re Southern Counties Gas Co., 2 Cal. R.C.R. 879; Re Customers of Boston Consol. Gas Co. (Mass.), P.U.R. 1929E, 9; Re Wisconsin-Michigan P. Co. (Wis. 1937), 16 P.U.R. (N.S.) 263; Racine v. Racine Gas L. Co., 6 Wis. R.C.R. 229;

These portions of the cost must then be apportioned among general household users, commercial and wholesale users, and heating users according to some equitable basis applying to each particular municipality. Where the gas utility is part of a consolidated property, such as a gas and electric utility, it is also necessary to apportion the common costs, such as bookkeeping, salaries of officers, rent of buildings, reading of meters, and cost of collection among these two divisions according to some equitable method, for the same meter readers serve both meters and a common bill is sent to each customer for both services.

Consumer Costs.—Certain components of expense are little affected by the amount of gas used by each customer. Among these are meter reading and billing, maintenance of meters, fixed charges on meters and service pipe extending from the main in the street to the customer's property line, which expenses remain approximately the same regardless of the amount of gas used. The total of these items, when divided by the number of customers, is referred to as the "customer" or "consumer" cost. In the state of Wisconsin, where the Public Service Commission has established the fixed-charge type of schedule, the major portion of this cost is assumed to be \$0.60 per customer per month. This cost for the small user is about the same whether natural or manufactured gas is supplied.

Distribution Demand Costs.—Inasmuch as the pressure at which gas is supplied to customers must remain within upper and lower limits, it is obvious that the size of the distribution mains is dependent upon the momentary peak loads of the customers. Ordinarily, instead of referring to these as instantaneous or momentary peak loads, the delivery of gas is taken over an hourly period, and the greatest use during any hour of the month or year is referred to as the maximum hourly demand for each period, respectively. In nearly all gas utilities the maximum hourly demand is caused by residential service on such holidays as Thanksgiving, Christmas, and New Year's Day and occurs shortly before noon (Fig. 16 shows the load curve of a small gas plant on Thanksgiving Day). Therefore, a scientifically designed rate based on the cost of supplying service should contain a demand element based on the momentary hourly maximum

demand of the year. This latter can be modified, however, by basing this portion of the demand cost on the maximum hourly demand of the month.

Manufacturing Demand Cost.—The size of the gas storage holders of manufactured-gas plants is such that the manufacturing plant is able to produce gas at a uniform rate throughout each 24-hr period. During times of the peak load, *i.e.*, when the gas sent out from the plant is at its greatest demand, gas flows from the generating plant and the holders at the same time. During periods when little gas is required by the customers, the

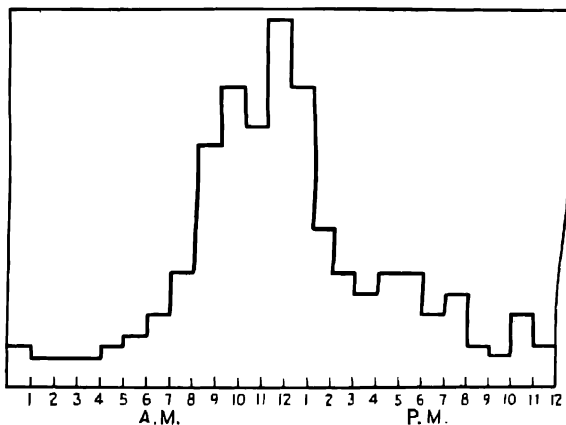


FIG. 16.—Thanksgiving Day load curve on a gas system.

amount by which that being manufactured exceeds the amount sent out is stored in the holders. It is therefore seen that, although the distribution system investment for a given number of customers is dependent on the maximum hourly demand, the manufacturing equipment necessarily depends upon a 24-hr demand for gas. Hence, a scientifically designed rate, based on the cost of service, should include one element that depends upon the 24-hr demand.

Commodity Costs.—These costs are not so dependent on the maximum demand or peak-load requirements as in electric service because of the ability to store gas in a holder. They do include the cost of fuel required in the manufacture of gas, labor, maintenance, and other expenses associated with the operation

of the gas utility. Prevailing gas rates are generally very simple in design, and the demand costs are taken care of in the commodity charge. The difficulty in determining the hourly and 24-hr demands, as well as the resentment that may arise on the part of customers to the use of the service charge, is largely responsible for gas block rates based only on the quantity used rather than on separate charges for the gas used and for the demand.

Rates for Gas in General.—The charges for gas are usually on the volume basis, *i.e.*, so much per hundred or thousand cubic feet of gas per month. Coupled with this rate must be a regulation requiring that gas of a specific Btu content be supplied. Since it is heating value that the customer is interested in purchasing, some rates are made on the “therm” basis, a therm being equivalent to 100,000 Btu. This method of charging for gas has been introduced in only a few of the states. Objection to this rate has been raised by the customers owing to the fact that there are no meters that give the therms used in a given month. The meters indicate in cubic feet, and the amount of use in therms must be computed by the company by applying the proper factor for the average quality of the gas furnished in the given month. The customer does not understand this extra technical term and suspects the utility of trying to collect extra amounts under this guise. In some decisions the commissions have required the utility to show on each bill both the cubic-foot use and the number of therms. In other states the commissions did not permit this form of charge because of objections from the majority of the customers. In the following citations, those from Illinois, Michigan, and New York approve the use of the therm basis and those from Indiana and Missouri oppose it:

Re Peoples Gas L. & Coke Co. (Ill.), P.U.R. 1930E, 34; *Re Illinois P. Co. (Ill.)*, P.U.R. 1932A, 124; *Binghamton Gas Co. (N.Y.)*, P.U.R. 1932D, 16 and 1933E, 480; *Re Syracuse L. Co. (N.Y.)*, P.U.R. 1932D, 385; *Re Michigan Federated Util. (Mich.)*, P.U.R. 1932E, 507; *Re Rates on Therm Basis (Ind.)*, P.U.R. 1932A, 113; *Re Laclede Gas L. Co. (Mo.)*, P.U.R. 1932E, 49.

By substituting natural for manufactured gas, almost twice as many heat units can be supplied by existing distribution facilities as before substitution. The number of heat units that can be distributed by a given system is also dependent upon the gas pressure. According to Boyle’s law, the volume of gas at a

given temperature varies inversely as the absolute pressure, so that by doubling the absolute pressure, twice as many heat units can be transmitted. In areas where the pressure falls below certain minimum amounts, this low pressure can be increased by laying a high-pressure main to that area and supplying gas from it into the low-pressure system. This is easily accomplished by means of reducing valves set to maintain a given pressure in the low-pressure system. In addition to the consumer charge, the gas-rate schedule must, therefore, provide sufficient revenue to take care of the distribution fixed charges and operating expenses.

The rate for natural gas taken from transmission lines that cross state lines has been difficult to determine. Since this is transportation of gas in interstate commerce, the control of this utility is delegated by the Constitution to the Federal government. This control has only recently been delegated to the Federal Power Commission, but so far no rates have been determined. However, in the Western Distributing Company Case in Kansas and in other similar cases, the state commissions have been given the temporary right of control over "gate rates" for gas from transmission lines where the distributing company is intercorporately controlled by the same holding company. The control of the gas rate from lines where the distributing company is not intercorporately related is still fixed by contract at arm's length between the two parties without control by any commission. Wholesale rates from gas wells to transmission companies and from intercorporately owned companies are covered in the following decisions:

MacThwaite Oil & Gas Co. v. City of Ada (Okla.), P.U.R. 1927D, 833; *Re Bowdoin Util. Co. (Mont.)*, P.U.R. 1930B, 20; *Re Lone Star Gas Co. (Okla.)*, P.U.R. 1933C, 1; *Re Capital Gas & E. Co.*, 193 Kan. 878, 33 P (2d) 731 (1934), 5 P.U.R. (N.S.) 1929; *Re M. & M. Pipe Line Co. (Tex. 1936)*, 11 P.U.R. (N.S.) 234; *Railroad Comm. of Texas v. Humble Oil & Ref. Co.*, (Tex. Civ. App.) 101 S.W. (2d) 614 (1937), 19 P.U.R. (N.S.) 35; *Western Distributing Co. v. Kansas Pub. Util. Comm.*, 285 U.S. 119, 76 L. ed. 655, 52 Sup. Ct. 283, P.U.R. 1932B, 236; *Dayton P. & L. Co. v. Ohio Pub. Service Comm.*, 292 U.S. 290, 78 L. ed. 1347, 54 Sup. Ct. 647 (1934), 3 P.U.R. (N.S.) 279; *Columbus Gas & Fuel Co. v. Ohio*, 292 U.S. 290, 78 L. ed. 1267, 54 Sup. Ct. 647 (1934), 3 P.U.R. (N.S.) 279.

The necessity for having a gas rate dependent upon demand is much less important than in the case of electric service. There

are, however, gas rates for large consumption where the total charge is dependent upon the rate of withdrawal of gas as well as upon the amount of gas used. The demand can be determined by actual measurement or from the maximum amount needed hourly by the equipment using the gas, which equipment is usually rated in number of Btu per hour. Where natural gas is distributed in cities located a considerable distance from the source of supply, thus requiring long transmission mains or pipe lines, the maximum hourly consumption is of far greater importance, especially when the amount being transmitted approaches the carrying capacity of the pipe line. This situation has led to the introduction of "priority" schedules for industrial and building heating uses. Priority schedules provide for curtailment or discontinuance of the supply of gas to such customers in the inverse order of their priority, in event the pipe-line capacity is insufficient temporarily to supply gas to all customers. Necessarily, such customers must provide facilities that can use oil or coal during the time when their supply of gas is curtailed or discontinued. The lowest priority customer usually enjoys the lowest rate, the next lowest a slightly higher rate, etc. Schedules such as these eliminate the necessity of a demand charge and therefore are based only on volume sold.

The following is a sample of the fixed-charge type of gas-rate schedule:

Service charge: \$0.60 per month

Commodity charge:

First 1,500 cu ft per month at \$1.35 per 1,000 cu ft

Next 1,500 cu ft per month at \$1.10 per 1,000 cu ft

Excess over 3,000 cu ft at \$0.90 per 1,000 cu ft.

Although a rate such as the preceding is reasonably equitable to all customers, it is sometimes objected to by the customers themselves, possibly because they are not sufficiently familiar with the underlying reasons therefor. In fact, in some states, legislation has been enacted prohibiting a service charge.¹ By

¹ Re Boston Consol. Gas Co. (Mass. 1936), 12 P.U.R. (N.S.) 113; Re Wisconsin-Michigan P. Co. (Wis. 1937), 16 P.U.R. (N.S.) 263; Coffeyville Gas & Fuel Co. v. Public Util. Comm., 116 Kan. 165, 225 Pac. 1063, P.U.R. 1924E, 87; Re Grand Rapids (Mich.), P.U.R. 1923C, 453; New York & Queens Gas Co. v. Prendergast, 1 F. (2d) 351, P.U.R. 1924B, 138; Illinois Commerce Comm. v. Peoples Gas L. & Coke Co. (Ill.), P.U.R. 1923E,

adopting a minimum-bill type of rate, this difficulty can be avoided. The following rate, when more than one dollar's worth is used, is practically equivalent to the foregoing schedule, the bill for 1,000 cu ft being \$1.95 in each instance:

| | | |
|--------|-----------------------------|----------------------------|
| First | 300 cu ft or less per month | \$1.00 |
| Next | 1,200 cu ft per month at | \$1.35 per 1,000 cu ft |
| Next | 1,500 cu ft per month at | \$1.10 per 1,000 cu ft |
| Excess | over 3,000 cu ft | at \$0.90 per 1,000 cu ft. |

Changing the heating quality of gas requires a change in both the length of the rate blocks and the price, if the customer is to receive the same bill for the same amount of heat used. Assuming the above schedules are for 500 Btu gas and that the heating value is to be changed to 800 Btu by mixing natural and manufactured gas, the foregoing schedules would be as follows:

Service charge: \$0.60 per month

Commodity charge:

| | | |
|--------|--------------------------|-------------------------|
| First | 937.5 cu ft per month at | \$2.16 per 1,000 cu ft |
| Next | 937.5 cu ft per month at | \$1.76 per 1,000 cu ft |
| Excess | cu ft per month at | \$1.44 per 1,000 cu ft. |

The minimum-bill type of rate would become

| | | |
|--------|-------------------------------|-------------------------|
| First | 187.5 cu ft or less per month | \$1.00 |
| Next | 750 cu ft per month at | \$2.16 per 1,000 cu ft |
| Next | 937.5 cu ft per month at | \$1.76 per 1,000 cu ft |
| Excess | cu ft per month at | \$1.44 per 1,000 cu ft. |

When these rates are changed to the therm basis, the schedules would be as follows:

SERVICE-CHARGE SCHEDULE

Service charge: \$0.60 per month

Commodity cost:

| | | |
|--------|-------------------------|------------------|
| First | 7.5 therms per month at | \$0.27 per therm |
| Next | 7.5 therms per month at | \$0.22 per therm |
| Excess | therms per month at | \$0.18 per therm |

MINIMUM-BILL SCHEDULE

| | | |
|--------|------------------------------|-------------------|
| First | 1.5 therms or less per month | \$1 |
| Next | 6.0 therms per month at | \$0.27 per therm |
| Next | 7.5 therms per month at | \$0.22 per therm |
| Excess | therms per month at | \$0.18 per therm. |

Some companies have adopted rate schedules based on hourly or 24-hr demand—similar to electric rates based on demand and energy consumption. A schedule of this nature is as follows:

Demand charge (payable monthly):

| | |
|--|--|
| First 1,000 cu ft of maximum hourly demand at \$6.00 per 100 cu ft | |
| Next 1,000 cu ft of maximum hourly demand at \$4.00 per 100 cu ft | |
| Excess cu ft of maximum hourly demand at \$3.00 per 100 cu ft | |
| plus | |

Commodity charge:

| | |
|---|--|
| First 10,000 cu ft per month at 10.0¢ per 100 cu ft | |
| Next 40,000 cu ft per month at 8.0¢ per 100 cu ft | |
| Next 50,000 cu ft per month at 7.0¢ per 100 cu ft | |
| Excess cu ft per month at 6.0¢ per 100 cu ft. | |

Assuming that the maximum hourly demand is 1,500 cu ft and that the use is 900,000 cu ft per month, the monthly bill would be calculated as follows:

Demand charge:

| | |
|--|-------|
| First 1,000 cu ft at \$6.00 per 100 cu ft..... | \$ 60 |
| Next 500 cu ft at \$4.00 per 100 cu ft..... | 20 |
| Demand charge..... | 80 |

Commodity charge:

| | |
|--|-------|
| First 10,000 cu ft at 10.0¢ per 100 cu ft..... | \$ 10 |
| Next 40,000 cu ft at 8.0¢ per 100 cu ft..... | 32 |
| Next 50,000 cu ft at 7.0¢ per 100 cu ft..... | 35 |
| Next 800,000 cu ft at 6.0¢ per 100 cu ft..... | 480 |
| Commodity charge..... | 557 |
| Total bill..... | \$637 |

Three-part rates similar to those for electric utilities can also be devised, the three parts being customer, demand, and commodity charges.

The problem to be answered when changing from manufactured to mixed gas or straight natural gas is the proper rate to be charged after the change so that the net revenue will be the same as before, on the assumption that each customer will use the same number of heat units after the change. There is a slight deviation between the efficiencies of equipment, especially because of pilot burners and other equipment that require about the same number of cubic feet of gas under each case, but this difference is so slight that it will be ignored in this discussion. Also, approximately the same number of cubic feet will be lost and unaccounted for because the amount escaping through leaks

is proportional to the pressure of the gas, and it is assumed that the pressure will be the same after as before the change. With these assumptions, the following equations can be set up:

N_1 = the number of 1,000 cu ft of gas sold before the change.

N_2 = the number of 1,000 cu ft of gas sold after the change.

aN_1 = the number of 1,000 cu ft lost and unaccounted for.

B_1 = the Btu heating value before the change.

B_2 = the Btu heating value after the change.

B_N = the Btu heating value of natural gas.

C_1 = the cost per 1,000 cu ft of gas before the change (cost of manufactured gas).

C_2 = cost per 1,000 cu ft of gas after the change.

C_N = cost of natural gas per 1,000 cu ft.

S = ratio of manufactured to natural gas in mixture.

R_1 = average rate per 1,000 cu ft before the change.

R_2 = average rate per 1,000 cu ft after the change.

Assuming other operating expenses to remain the same, the following relationship must exist in order to secure the same net revenue:

$$N_1 R_1 - (N_1 + aN_1)C_1 = N_2 R_2 - (N_2 + aN_1)C_2$$

$$B_2 = \frac{SB_1 + B_N}{S + 1}$$

$$C_2 = \frac{SC_1 + C_N}{S + 1}$$

$$N_2 = \frac{N_1 B_1}{B_2} = \frac{N_1 B_1 (S + 1)}{SB_1 + B_N}.$$

By letting $B_N = KB_1$ and $C_N = mC_1$, the value of the average rate after the change becomes

$$= \frac{S + k}{S + 1} R_1 - \frac{k - m}{S + 1} C_1 + a \frac{(S + k)(1 - m)}{(S + 1)^2} C_1.$$

If we assume $R_1 = \$1$ per 1,000 cu ft, $C_1 = \$0.35$ per 1,000 cu ft, $a = 5$ per cent, a mixture of 50 per cent manufactured and 50 per cent natural, $B_1 = 500$ Btu per cu ft, the average rate after the change becomes \$1.325 per 1,000 cu ft. By making the change, the customers would be getting 750,000 Btu for \$1.325, whereas before the change they were getting 662,500. The relationship among the several factors is shown on Fig. 17.

It was common practice some years ago to sell gas by means of prepayment meters. With such meters, the customer inserted a coin, usually 25 cents, in the meter, the coin actuating a lever turning on the gas. After a predetermined quantity of gas equal to the value of the coins dropped into the meter had been used, the supply was automatically cut off until another coin was inserted and the operation repeated. At periodic intervals, the utility collected the money in each meter, read the meter, and inspected its operation. This type of meter has largely been

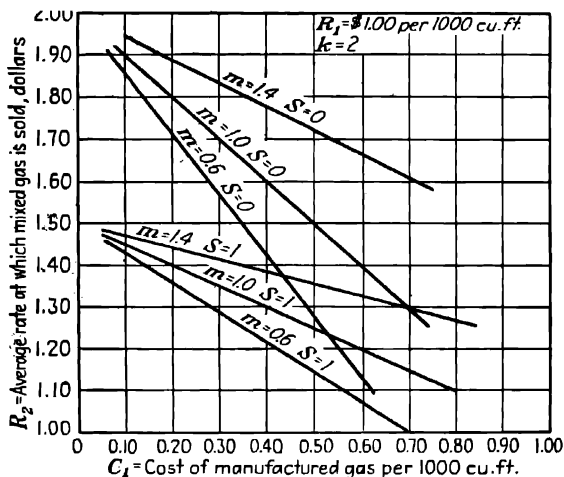


FIG. 17.

abandoned since the expense saved by the company was only that due to billing and collecting and losses due to uncollectible accounts and also the use of gas could not be encouraged by providing lower rates for additional or more than average use. The illegal use of slugs and the difficulty of requiring a minimum bill for each month's use of gas offset the saving in uncollectible accounts, thus largely removing one reason for the use of such meters. Furthermore, customers were often inconvenienced by not having a coin of the correct denomination at hand and were accordingly without gas until the proper coin was secured and inserted. Recently a demand for such meters has again arisen from tourist-camp

operators, who by such means are able to provide travelers with the convenience of gas stoves.

Where the rate structure contained a minimum-charge portion, it was necessary for the collector to require all customers whose meters did not contain a sufficient monthly deposit for such a charge to make up this minimum charge each month when the collection was made. Needless to say, such coins should not be put through the recording mechanism of the meter, as they do not represent payment for gas used but for service rendered.¹ A very good discussion of the difficulties of the use of prepayment meters is contained in the following citation:

A gas company is entitled, on account of the greater cost of installation and maintenance, to make a reasonable additional charge for gas sold through prepayment meters, put in only at the request of its customers, over the rates for gas sold through standard credit meters. The reasons for the additional charge are the additional cost consisting of higher maintenance expense because of extra mechanism; greater installation expenses because of the necessity of locating meters in safe places to prevent theft; additional expense in reading meters and collecting the money; prepayment meters being scattered more than other meters, casual labor not being competent to handle the money; absence from any advantage from prepayment since the company does not get the money much earlier than that from other meters; losses from theft of prepayment meters; injuries to meters by thieves; and additional bookkeeping expense.—*Re Western Gas & E. Co. (Ill.)*, P.U.R. 1915A, 1086.

For residential and the smaller commercial and industrial users, gas is measured by means of displacement meters. For larger users a meter of this type would have to be too large so that it is the practice of some utilities to set several meters instead of one large one. For still larger consumption, where gas is sold under high pressure, an orifice-type meter is used. The principle of such a meter is to insert in a joint of the pipe an orifice of smaller diameter than the pipe through which the gas is flowing, and from the pressures recorded on each side of the orifice, together with the temperature and specific gravity of the gas, the volume passing through the meter is calculated. Such

¹ *Re Rockford Gas L. & Coke Co. (Ill.)*, P.U.R. 1920E, 461; *Re Wausau Gas Co. (Wis.)*, P.U.R. 1929E, 493; *Re Georgia P. Co. (Ga.)*, P.U.R. 1929B, 309.

meters are in reality "rate of low" or "demand" meters and not volumetric, but by knowing the time during which the rate of flow exists, the volume can be determined. The payment for gas is based on the volume at a specified temperature (as, for example, 60°F.) and at a specified pressure (say, 4 ounces above atmospheric pressure of 14.65 lb per sq in.). In such calculations use is made of the formula

$$PV = RT$$

where P is the absolute pressure, *i.e.*, actual pressure in pounds per square inch plus 14.65, V is the volume in cubic feet, T is the absolute temperature, *i.e.*, temperature in degrees Fahrenheit plus 461°, and R is a constant for each particular kind of gas. The volume is affected also by the specific gravity, since a pound of gas of small specific gravity occupies a larger volume than one of greater specific gravity.

In the case of electric service, sample daily load curves of customers were shown. Load curves for gas consumption can likewise be prepared, and, if the characteristics of a particular class of customers are known, a rate schedule can be devised for the class and for different uses. For example, a storage-type gas water heater equipped with a gas burner of small capacity uses gas over a great many hours each day. When gas is used continuously at a uniform rate, there is no need for a gas holder, so no portion of the holder cost need be included for such usage. Long transmission lines and mains containing gas under high pressure serve also in a limited way as gas holders or storage capacity. These factors make the importance of instantaneous or short-time interval demands of gas of much less consequence than demands extending over longer periods, such as a day.

On the theory that the use of additional gas by customers at a rate slightly more than the incremental operating expense will contribute something toward the payment of overhead expenses including return, there are being introduced so-called "purpose-type rates" for such uses as bread baking, water heating, and house heating. The sale of gas for any purpose except sparing use is highly competitive, and it is the object of such purpose-type rates to meet competition in some lines without suffering a loss in revenue from sales for other uses that do not require a rate of as low a level. Where a customer uses gas for several purposes,

the use of a separate meter for each purpose may be avoided by determining the amount of gas used for each purpose by size and class of equipment. For example, a restaurant may be using gas for preparing meals, baking bread and pastries, heating water, and for building heating. If the size of the stoves, ovens, and water heater is known, a block-rate schedule can be determined, in which the lengths of blocks at each rate can be dependent upon the equipment. Such a schedule would approximate the total bill the customer would pay if there were several meters installed, one for each class of service. A schedule such as this requires frequent checking to ascertain whether additional equipment has been installed or if any changes have been made which may necessitate a revision of the schedule, and from that angle such a rate is unsatisfactory.

To make the meaning of purpose-type rates more clear, let us assume that a restaurant has three ranges, two bake ovens, one large water heater (equivalent to two small ones), and in addition uses gas for building heating. Furthermore, assume that the rate for cooking is \$1.35 per 1,000 cu ft, for baking \$0.90, for water heating \$0.75, and for space heating \$0.50, and that a small water heater uses 3,000 cu ft, a range 2,000 cu ft, and a bake oven 1,500 cu ft. The rate would be determined as follows:

3 ranges at 2,000 cu ft = 6,000 cu ft to be charged at \$1.35
2 bake ovens at 1,500 cu ft = 3,000 cu ft, to be charged at \$0.90
2 small water heaters = 6,000 cu ft, to be charged at \$0.75
Excess use of gas to be charged at \$0.50.

Instead of using four meters, only one is necessary for this whole installation. Knowing that his average rate will be increased if more equipment than he really needs is installed, the customer will refrain from installing it, and so, temporarily at least, he will operate at a better load factor. If the use of each appliance remains unchanged and all customers have approximately the same habits, the rate for each such usage can be approximately determined, for the effect of each hourly and daily demand will be known within reasonable error.¹ However, this

¹ Re Oblong Gas Co. (Ill.), P.U.R. 1915A, 598; Re Public Service Co. of Northern Ill. (Ill.), P.U.R. 1924B, 386; Levy v. Atlanta Gas L. Co. (Ga.), P.U.R. 1931C, 24; Public Service Comm. v. Seattle L. Co. (Wash.), P.U.R. 1925A, 61; Re Denman (Idaho), P.U.R. 1928C, 672; Re Springfield Gas L. Co. (Mass.), P.U.R. 1929A, 229; Re Los Angeles Gas & E. Corp. (Cal.),

type of rate has discriminatory features that were discussed under Discrimination in Chap. XVIII.

Water Rates. General.—Similar elements exist in water utilities as in gas utilities. Although the water does not have to be manufactured, it usually has to be processed or treated to render it wholesome and safe for use by domestic consumers. Sometimes the source from which the water is obtained is situated at a considerable distance from the municipality or district in which it is to be used. Such transportation of water requires a large investment in pipes, canals, pumping equipment, dams, and other structures devoted to the acquisition of the water. When the source is a river, lake, or well near a municipality, the water is usually pumped first into a purification and filtration plant to remove dangerous bacteria and foreign matter which may be present so as to make it more potable. From the treatment plant it is pumped either directly into the mains or into storage reservoirs at some elevation sufficient to produce the proper pressure in the mains. In a few installations, particularly in mountainous regions, the source of supply may be at a level higher than the municipality where the water is to be consumed, and then the pressure is maintained by gravity, a considerable saving in cost of operation over that necessary for pumping.

Unlike electricity or gas, there is no advantage in transmitting water at higher pressure to a point near the consumer and then reducing the pressure. The rate of use or demand determines the size of pipes and mains, too small a pipe for the given demand causing an excessive loss of pressure at the outlet and poor service to the customer. This element makes some form of demand charge desirable for water rates.

Rates for Municipal Uses.—In addition to supplying water for household and commercial uses, water systems furnish water for municipal uses, such as fire protection, street sprinkling, flushing of sewers and streets, municipal buildings and park systems. This municipal use of water, especially that for fire protection,

P.U.R. 1927C, 547; Re Peoples Gas L. & Coke Co. (Ill.), P.U.R. 1931E, 457; Re Consumers P. Co. (Mich.), P.U.R. 1928D, 698; Re Detroit Edison Co. (Mich. 1936), 15 P.U.R. (N.S.) 222; Madison Restaurant Ass'n v. Madison Gas & E. Co. (Wis. 1937), 17 P.U.R. (N.S.) 1; Re Birmingham Gas Co. (Ala.), P.U.R. 1932B, 241; Re Boston Consol. Gas Co. (Mass. 1936), 14 P.U.R. (N.S.) 433.

causes the greatest demand on the system and is responsible for the size of the mains and a considerable part of the pumping system. Water for fire protection does not need to be treated before being introduced into the mains, and in some cities two sets of mains are supplied, one at high pressure for fire protection and the other at lower pressure for all other uses. Such a system causes an increased investment for mains but a lower investment and operating cost for the treatment and storage of the water. The charge that a municipality should pay for the fire-protection service is that for the potential demand as such water is not metered. However, all other use of water by the municipality should be metered. Where such water is drawn from hydrants, it is difficult to measure this consumption, so separate outlets with meters should be provided.

"The cost of rendering fire protection service ranges from 30 per cent in large plants to 70 per cent in small plants, of the total plant investment." *Monroe v. Monroe Water Co. (Wash.)*, P.U.R. 1920E, 444. "A separation of the total investment between public and domestic or private use, based on the same methods as outlined in previous decisions, showed 75 per cent or more of the total investment has been made necessary for fire protection and other public purposes." *Re Jefferson E. L. & Water Plant*, 5 Wis. R.C.R. 555. "In several cases detailed studies have been made by us to determine the proper percentage of total revenue which should be allocated to fire service. This has been found to vary from 12.5 per cent for the larger companies to as high as 25 per cent and even 30 per cent for the smaller companies. In this case, it is our opinion that about 12.5 per cent is the proper proportion of total revenue to be collected from fire service in each division." *Re New Jersey Water Co. (N.J.)*, P.U.R. 1929B, 279.

Many water utilities are municipally owned and operated. In many of these installations water is supplied free for all municipal uses. In such cases the domestic and commercial users are forced to pay for the entire operation of the system. Since fire protection and water for other municipal uses should be paid for from regular taxes, it is seen that free water to the city, in effect, throws an extra burden upon the users of water who pay the entire expense of operation. This causes a discrimination against these users, for there can be no real proportionality between the amount of water used and the amount of tax to be paid. A proper allocation should be made between

the costs of public and private service. The municipality should then pay its proper share for operation of the water system, the water utility paying in turn a tax to the city on the same basis as a privately owned utility rendering the same service and having the same investment.

Public Fire Protection.—Early rates for fire-protection service were on the basis of a charge for each hydrant, ranging from \$25 to \$50 or more per hydrant per year. Such rates were more or less arbitrary, being arranged by agreement in the franchise for privately owned systems. Such rates discouraged the installation of the proper number of hydrants for fire protection, particularly in the residential districts. This scarcity of hydrants was accompanied by higher insurance rates on the residence property. The more modern rates for such service contain a specific annual charge for fire service based on an allocation of the capital and operating costs between the two services. One method of accomplishing this allocation for the mains is to charge the value of all mains 6 in. or larger to fire protection to which charge is added all hydrants and fittings occasioned by their installation and any extra plant or pumping equipment. All other investment is charged to the other services. As additional hydrants are added, this annual charge is increased on the basis of the additional annual investment cost for each hydrant and its connections, a sum much less than the usual hydrant charge under the older systems. A further modification of this method is explained by the New Jersey Commission in the following citation:

“Premising the collection of the fire service charge upon a hydrant charge and an ‘inch foot’ charge, the cost of fire service was found to be as follows:

| | |
|--|----------|
| 1,055,020 inch-feet at \$0.009..... | \$ 9 495 |
| 142 hydrants at \$7.50..... | 1 065 |
| Total annual fire charge..... | \$10 560 |
| Average cost per hydrant \$74.37 per year. | |

Inch-feet are found by multiplying for each sized main the number of inches in diameter by the number of feet in length. The amount of money to be collected by the inch-foot charge is divided by the total number of inch-feet to obtain a unit price per inch-foot. By the use of the inch-foot unit the total charges for fire protection keep pace

automatically with the growth of the distribution system." *Re Acquackanonk Water Co. (N.J.)*, P.U.R. 1923D, 60.

NOTE: It should be noted in the above case that double the number of hydrants would cause a total charge of only \$11,625.00, or only a total annual cost for all fire protection of \$40.80 per hydrant, providing no addition need be made in the inch-feet of pipe required to serve them.

"Experience shows that the cost of fire protection, arrived at on a hydrant basis, has actually prohibited the installation of necessary fire hydrants in municipalities." *Re Spencer Water & Ice Co. (W. Va.)*, P.U.R. 1924C, 159. "Water revenue from public fire protection service in several localities should not be distributed on the basis of the number of fire hydrants in each community, since the cost of service bears only an indirect relation to the number of hydrants, and such method does not equitably distribute the burden among the communities, and tends to prevent the full development of the facilities for fire protection service." *Thayer v. Beaver Valley Water Co. (Pa.)*, P.U.R. 1916E, 962.

Private Fire Protection.—Some large manufacturing plants having extensive areas to protect install their own private hydrants and fire equipment. Such establishments use water for many other purposes in manufacturing processes and therefore consume a considerable quantity. For such installations the rates are usually made on a demand basis according to the size of the pipe connection and the basis of large-quantity consumers of water. In addition to these establishments, large business blocks containing valuable merchandise install automatic sprinklers in such positions that, when valves in these systems are heated, by smoke or fire to a point considerably above room temperature they automatically open and apply water to the region immediately below them. Such automatic systems extinguish incipient fires at the source and protect the remainder of the property and merchandise from fire damage. Such automatic systems are supplied from large pipes connecting directly to the water mains and are a potential demand on the water system. The plea is often made by those installing such sprinklers that they should pay no charge for such service since they draw no water from the mains except in case of fire and that then they protect the property in the neighborhood by extinguishing the fire. The service is valuable since annual insurance rates are much lower for merchandise and buildings that are protected by automatic-sprinkler service. The rate is usually

fixed on the basis of a demand charge determined by the size of connection to the main. Other water used by such a customer is metered through a by-pass meter and does not come from the sprinkler system.

"Rates for private fire protection should equal the monthly minimum charge provided for such a service connection of the same diameter as the fire connection." *Re Noblesville Water & L. Co. (Ind.)*, P.U.R. 1921D, 283. "As a matter of good sense the property owner beneficially employs the water mains for his own purposes and to his own advantage, although he may not, except in the case of fire, actually draw any water from the pipes. It is necessary and proper that for this he should pay. In effect, he gets something of peculiar value from another, which that other is not compelled to give except on the basis of contract." *Gordon & Ferguson v. Boran*, 100 Minn. 343, 111 N.W. 272.

Early Domestic Rates.—The common practice in early domestic rates was to charge for water on a flat-rate basis for each faucet or fixture, by the number of rooms, foot frontage of property, etc. The undesirable features of such methods gave way gradually to charging on a metered basis, although there still are some communities where flat rates exist. The principal objections to flat rates are the wastage of water by letting faucets remain partly open, which requires an enlargement of facilities at an earlier date than otherwise would be necessary and causes a discrimination in charges between customers.

The types of rates used at the present time are, generally speaking, block rates together with minimum charges dependent upon the size of meter. The prevailing meter size for residence service is $\frac{5}{8}$ in. The peak load usually occurs during the summer dry season when lawns are being sprinkled. Since this occurs over the entire residential district at the same time, the additional demand expense caused thereby need not be collected by means of a separate demand charge but can be taken care of by a slightly higher unit charge throughout the year. This discriminates against commercial and industrial establishments which do not use water for such purposes, but the complexity that would arise if the discrimination were eliminated does not justify taking this into account except for large-consumption rates. Either a minimum or a service charge is just as necessary as in electrical and gas rates, although the public generally does

not favor either of these charges. Poorer people are apt to curtail their use of water to the point where their living conditions become unsanitary, unless they are obliged to pay a minimum charge which induces them to use a certain amount of water each month.

All these considerations have caused demands on the part of the public for lower and lower water rates, which have caused municipally owned systems to assess the cost of laying mains against the abutting property, thus avoiding interest charges on such mains. Where so much consideration must be given to fire protection, health, and sanitation, authorities have a broad field from which to choose the particular rate schedule.

In any given system, the expense of pumping additional amounts of water is usually not very great. However, as a city grows, it may find the requirement of securing an additional supply of water a proportionately greater burden, and in the case of very large cities or those located in arid regions, water is sometimes brought from great distances. Hence, it does not follow that large-scale operations of water utilities will result in a lower cost per gallon of water. Quite the contrary may be true where the present source of supply is limited. This fact has a great bearing on the desirability of taking on new large users when the present supply of a plant is nearing exhaustion. The question then arises of whether to charge the additional financial burden to the new customer or to spread this cost over all the customers.

Steam and Hot Water for Building Heating. General.—During the period of operating electric utilities in northern climates, when the electric generators were driven by low-pressure noncondensing engines, the by-product exhaust steam was sold for heating near-by commercial buildings. This heating load during the winter months served as a source of extra income to these utilities. Sometimes the heat was conveyed to the buildings as low-pressure steam and sometimes as hot water heated by the exhaust steam and then piped to the buildings that were located too far distant to be reached economically by steam mains. (A cubic foot of water at 200°F. contains more useful heat units than a cubic foot of steam). Steam consumed in any building is determined by a condensation meter. This meter measures the quantity of condensed steam (water) returned from

each building and thus indirectly measures the quantity of heat furnished by the steam at a given pressure and quality. For the hot-water heating load, no satisfactory method of measurement has yet been devised, and it is necessary to determine the heating service furnished from these mains in an indirect manner by calculating the required radiation in each building or portion of the building served, by the use of formulas well-known to heating engineers. In these calculations outside exposures and temperatures as well as exposures to unheated portions of the building must be used.

Allocation.—Allocations between the electric and steam-heating portions of the costs of the generating station are difficult to make. In some cases electric generation was commenced as a by-product of steam heating, but in most cases, the opposite was the basis of allocation. In the case of furnishing steam as a by-product of the generation of electricity, there was very little of the overhead cost of the boiler plant charged to the steam-heating load. The entire cost was then based on the extra fuel and labor necessary to produce the electric energy with back pressure on the engine over that required if the steam were exhausted into the air. This method resulted in almost the entire cost of serving these customers being made up of the cost of the overhead expenses and maintenance and consumer costs of this service with very little remaining for the cost of producing the steam. In other cases the expense of the exhaust steam was measured by the number of heat units contained in the exhaust steam as compared with that in the high-pressure steam from the boilers. This measure included the overheads of the boiler plant as well as the actual cost of the fuel and labor used in the production of the steam. Other methods of allocation were based on the excess plant and operating costs necessary to furnish the two services over that necessary for the single service.

The costs of each service will generally not be the same for two plants located in different cities, for the climatic conditions and the ratio of steam load to electric are usually different. There are two independent variables, *viz.*, the amount of steam and electric energy sent out from the plant, the operating expenses being the dependent variable. By obtaining the costs and output of both steam and electricity for a great many months, both summer and winter, an average cost may be obtained. The

monthly fuel costs of one such plant were obtained and are expressed by the following formula:

Fuel cost = \$2,600 + \$0.0036 per kwh + \$0.00019 per lb of steam.

Modern Conditions.—Technologic changes in the art of generation of electricity from steam have made the heating load from exhaust steam undesirable in most installations. Modern steam plants use condensing turbines and much higher steam pressures with superheated steam. The heat in the low-pressure steam at heating pressures is usually much more valuable for the production of energy in the condensing turbine than when sold for steam heating. In a few instances heating is still supplied from "bleeder turbines" at low-pressure stages, but generally separate boilers are used to furnish the heating load, or else this load has been abandoned. Where low-pressure reciprocating engines or turbines have been retained on account of the heating load, the cost of generation of the electrical energy is much greater than it would be in a modern generating plant.

Rates for Heating.—The rate for steam or water heating of buildings from central heating plants that are not connected with the generation of electricity are relatively simple to devise. The demands all come at the same time, for all buildings experience the same outside temperatures. The rate is usually either a flat rate based on the heating demand as calculated from necessary radiation or else it is a straight-line rate based on the cost per unit to furnish the steam as measured by the condensation meters.¹

Telephone Rates. General.—Telephone systems differ materially from those for electricity, gas, or water in that they are more national and even international in their scope and service. Although there are a number of independent telephone systems serving state, city, or rural areas, the greater part of the telephone service of the country is rendered by local companies that are owned and operated by the American Telephone and Tele-

¹ Re Lapeer (Mich.), P.U.R. 1923B, 736; Re De Kalb-Sycamore E. Co. (Ill.), P.U.R. 1915E, 904; Re City of Bloomington (Ind.), P.U.R. 1932B, 253; Springfield Gas & E. Co. (Ill.), P.U.R. 1920A, 446; Re Wisconsin-Minnesota L. & P. Co. (Wis.), P.U.R. 1919B, 318; Re Interstate Pub. Service Co. (Ind.), P.U.R. 1918F, 498; Re City of Sturgeon Bay (Wis. 1936), 13 P.U.R. (N.S.) 489.

graph Company, sometimes called the Associated Bell System. Through this interconnected system a subscriber may call any person in his own municipality or, through long-distance connections, any one of over 90 per cent of the telephones in this country. Through radio connections with foreign countries, he may also be put into telephonic communication with any city in the world that has a local system connected with this foreign radio exchange service.

The American Telephone and Telegraph Company also renders other services over its facilities, such as press service and other leased-wire service for radio broadcasting, television broadcasting, etc. As explained under the subject of operating expenses, the associated companies are also furnished other services in connection with financing, purchase of supplies, manufacture of equipment, research, etc., by the main holding company. Through the exchange interconnection with independently owned systems, these independent systems also may render long-distance service between their own subscribers and those connected with the Bell System. These interconnections make the value of the telephone service greater than that which can be measured by the simple cost of completing the local calls within a restricted zone.

Unlike the service furnished by electric, water, and gas utilities, the entire equipment used by a subscriber making a call is owned by the telephone company. This equipment consists first of the instrument or subscriber's station which may be of the wall, desk, or hand-set type, with possibly one or more extensions; the wiring and protective equipment; service leads from the house to the lines; open-wire or cable connection to a central office located near the subscriber's premises; internal wiring, relays, and protective equipment in the central office; connections to subscribers' jacks on switchboard panels in front of operators for manually operated systems, and to line switches, selectors, and connectors for automatic systems, so that each telephone in the exchange may be connected to any other. In order to facilitate the connections for each call, each operator must be supplied with the necessary plugs, operator's equipment, switches, and jacks together with supervisory connections and equipment.

There is a definite limit (10,000) to the number of jacks (or subscribers) that a single operator can reach without moving from her position. When the number of subscribers exceeds this

physical limitation, it becomes necessary to install more exchanges. To accomplish connection between exchanges, trunk lines must be provided between each exchange and every other exchange in a given city, and the connecting jacks of these trunk lines must be within reach of each operator at each exchange unless a special trunking board for making such connections is supplied. For automatic exchanges a similar limitation is reached, since only 100 positions are usually provided for each switching device, and each multiple of 100 subscribers requires extra instruments. The automatic systems are provided with separate exchanges in each neighborhood both for limiting the length of the subscriber's connection and for reducing complications in the switching system.

Long-distance lines are terminated in a separate switchboard with trunk lines to each of the exchanges in the system. These long-distance lines connect through cables or open wires all centers of population in this country and with the bordering countries on this continent. These stations also connect to the radio terminals where messages are transmitted by radio to foreign countries. On the long-distance lines, repeating stations are installed at equal intervals to amplify the energy of the message and offset the losses incurred in transmission.

Rates in General.—Telephone rates are divided into two main classes, *viz.*, "local" and "long distance." The former is usually a monthly charge permitting any number of calls to be made within a specified area as, for example, within a city. The latter has to do with charges for calls between points more distant from each other, such as between cities. The value or usefulness of a telephone system is directly dependent upon the ability of one subscriber to talk to another at the time he wishes to do so. With a large number of subscribers, there will be more calls, requiring more than a proportionate investment and costs of operation so that higher rates are justified by the greater expense.

Telephone rates were fixed, first, by classifying telephone exchanges, and, second, by classifying the service rendered by these exchanges, the size of the exchange, population, industrial development, residential factors, saturation, the character of the population, the prosperity of the community, and other factors being considered, it being recognized that the legal prohibition of discrimination between localities compels

classification or grouping of similar exchanges rendering like contemporaneous service. *Re Michigan Tel. Co. (Mich.)*, P.U.R. 1923A, 30.

If the average length of time per call is short, the equipment, such as trunk lines between offices, which are devoted to common use, need not be so extensive as when the average time used is long. This brings in the element of time as a factor to be considered. Patrons using their telephones in such manner that the time per call is extremely long are really doing themselves an injustice, in that it deprives some third party from talking with either until their conversation is concluded. For this reason, it is advisable to put some limit on the time per call which, when exceeded, will provide for an extra charge. In long-distance calls where the time element is equally as important as the distance, primary charges are on the basis of 3 min for each call with an extra charge for each additional minute. This principle holds true even with the newer carrier current transmission of many messages over a single pair of wires, for there is always a maximum number of messages that may be accommodated with good service to all.

The number of calls during each hour is not uniform throughout the day. A peak load occurs around 11 o'clock in the morning. During the early hours of the morning the calls are relatively few in number. This variation in calls has led to the introduction of lower charges for long-distance service during the evening and night.

It is not necessary that each subscriber be provided with two wires from the central office for the exclusive use of his instrument. More than one can be served with the same pair of wires, but when more than one are served, as, for example, on a two-party line, one party may be inconvenienced by finding the circuit in use by the other party on the same line and thus be forced to wait before making his call. Lines extending into the country are in the majority of instances multiparty lines with single-wire and ground return. Considerable economy in investment is thus accomplished, for one circuit is used by more than one subscriber, but this economy is to a very considerable extent offset by the lessening quality of service.

Like any other business that is to remain a going concern, a telephone utility must earn sufficient revenue to pay its operating

expenses, depreciation, etc., and a return on the money invested in the business. The charges must be such as to bring in this revenue, and they should be distributed as equitably as possible among subscribers with both cost of service to the utility and value of the service to the subscriber being taken into consideration.¹

Telephone rates must be developed on the trial-and-error basis with due consideration to the relative value of each service, in view of carrying costs for individual equipment plus expenses of operation and the variation in the value of the service for different classes of subscribers.—*Re New Jersey Bell Tel. Co. (N.J. 1935), 6 P.U.R. (N.S.) 258.*

Rates for Residential Service.—As previously stated, the equipment devoted exclusively to a subscriber located in a residence and receiving such service consists of the instrument and connections on his premises, the circuit connecting the residence with the central office, and the terminal connections and equipment at the central office connected exclusively to his line. In addition, the subscriber may have one or more extensions and other facilities furnished by the company for his use. The subscriber is privileged to call any one of the other subscribers within the particular zone or area in which he lives without the payment of a toll charge. In most cases the charge is for flat-rate service without any limit as to the number of outgoing completed calls that each subscriber may make. The value of this service to the subscriber consists in the number of calls he may make and the number of telephones in his particular zone; the ability to call for emergency service, such as police, fire protection, medical and hospital service, day or night, good or bad weather; and his ability to call any other exchange over long-distance lines. The cost per subscriber of supplying this service increases with the number of subscribers served. For this reason, rates are higher in large cities than in smaller areas, but this is offset by the extra value of such service to the subscribers. Lower rates are provided for two- and four-party line service. Such service is usually selective signaling, but this does not give exclusive use of the line to any one subscriber. As a consequence, it is less valuable as well as less expensive. Where extensions are furnished on any sub-

¹ *City of Los Angeles v. Southern Cal. Tel. Co. (Cal. 1936), 14 P.U.R. (N.S.) 258; Re New York Tel. Co. (N.Y. 1936), 14 P.U.R. (N.S.) 443.*

scriber's premises, an extra charge is made for the use of this extra equipment.

Large areas are sometimes divided into zones for the determination of rates. This permits lower rates for all calls within the particular zone in which the subscriber resides but requires a toll charge for interzone calls. In making the base telephone maps for such zones, contiguous areas in built-up sections of a district must be included in single zones without regard to the city limits.

"The establishment of a primary rate area boundary is merely an arbitrary division used in determining the proper spread between those subscribers within and those outside the primary rate area. Inside the primary rate area the charges for a particular service are identical for all subscribers. The subscribers outside the primary rate area may receive the service rendered within the primary rate area under the primary rates plus mileage charges based on the difference between the subscriber's premises and the nearest point on the primary area." *Re Southern Cal. Tel. Co. (Cal.)*, P.U.R. 1925C, 690. "Subscribers should not be penalized by the imposition of a zone system, merely because the company has not located the central office in the telephonic center of the community served." *Re Redondo Home Tel. Co. (Cal.)*, P.U.R. 1920E, 26. "Base-rate telephone maps should identify the area served with the built-up sections of the localities." *Re Mountain States T. & T. Co. (Mont.)*, P.U.R. 1927A, 117.

In some cases, the outgoing calls at the primary rate are limited to a fixed number each month. All calls are metered, and a charge is made for each call over the base number. This kind of service is seldom favored for residence service, for the extra cost of metering the calls and making the extra collections partly offsets the extra income from such service. Merchants living in such areas are usually willing to pay higher rates rather than to have the telephone company collect more from the residence subscribers, for many of these calls are for merchandise, etc., ordered from these dealers. Where outgoing calls are metered, they are limited to strictly completed calls and exclude long-distance calls.¹

¹ State ex rel. American Telechronometer Co., 164 Wash. 483, 2 Pac. (2d) 1099, P.U.R. 1931E, 482; *Re Michigan Bell Tel. Co. (Mich. 1934)*, 4 P.U.R. (N.S.) 164; *New England T. & T. Co. (Mass. 1934)*, 5 P.U.R. (N.S.) 333.

"A properly designed schedule for measured service telephone rates should recognize at least three elements: (1) There should be a minimum charge sufficient to guarantee that the very small user will not be furnished with equipment and with the advantage of the company's readiness to serve at the expense of the other users in his class or in other classes; (2) there should be a measured rate for traffic in excess of the guaranteed minimum which rate should be sufficient to carry the direct cost of handling the message and fixed charges such as are involved in the average of the traffic which is not strictly off-peak in nature; (3) there should be another step in the schedule which should provide a somewhat lower rate per message as traffic increases in recognition of the fact that after a certain point is reached increased traffic is necessarily of an off-peak nature and such should carry somewhat less in the way of fixed charges." *Re Wisconsin Tel. Co. (Wis.)*, P.U.R. 1920C, 116. "Two-party measured service is impracticable and should be discontinued, but two-party unlimited residence service should be continued and those subscribers desiring cheaper class of service should be furnished with four-party residence, semi-selective service." *Re Indiana Bell Tel. Co. (Ind.)*, P.U.R. 1924A, 4. "The term 'message' as used herein means a completed call to the number desired. Busy calls, trouble calls, and calls to long distance, are not referred to as message and will not be charged for under the schedule." *Re Southern Cal. Tel. Co. (Cal.)*, P.U.R. 1925C, 692. "An analyzed peg count of originating calls which gives no information about the destination of the calls cannot be the true criterion of the general benefit to the patrons as a whole of a particular service, since the recipient of a call may receive equal or more benefit from a call than the calling party." *Re Arthur Mutual Tel. Co. (Ill.)*, P.U.R. 1927E, 374.

The so-called "hand-set" telephone, sometimes also called the "French telephone" or the "monophone," is a device composed of a combination of receiver and transmitter in one instrument to be held in the hand and taking the place of either the wall-type instrument or the so-called "desk set." This instrument was developed for introduction principally to replace the desk telephone. In order to discourage too rapid a demand for this new instrument, the telephone company charged an extra price. This extra price was partly justified by its greater cost and partly to offset the obsolescence of the older sets caused by this introduction. This extra charge was made 25 or 50 cents per month with no date of termination. The commissions held that the extra charge was justified only on the ground of greater investment and that this extra cost should be terminated with

the payment of this investment charge. In consequence, telephone companies have placed a time limit of two years in most states and have reduced all charges first to 25 cents and later to 10 cents per month during that period and lately have eliminated them.

"The only justification for an additional charge for hand-set telephone service is to be found in the additional cost of providing that service, and should not be based on the erroneous theory that hand-set equipment is a luxury." *Re Hand-set Telephones (Ga. 1934)*, 3 P.U.R. (N.S.) 50. "A monthly charge for hand sets should be eliminated after the subscriber has paid for the extra cost over that of the standard set." *Re New England T. & T. Co. (Mass. 1934)*, 5 P.U.R. (N.S.) 333. "Hand-set telephone charges of a telephone company were reduced from 15 cents to 10 cents monthly." *Re New York Tel. Co. (N.Y. 1936)*, 14 P.U.R. (N.S.) 443.

During the World War when the United States Government took over the operation of all principal telephone systems in this country, charges were made for making installations, moves, and changes in telephone locations. These charges have been continued in most states. The justification of them is made on the basis of the cost to the telephone company for making such changes. The average time for the location of any single residence telephone in one place is less than one year. When no charge is made for changes in location, a discrimination is made against those who do not request this service in favor of those who do.

Installation charges are closely related to charges for moving an instrument from one location to another. If no installation charge is made, it is practically impossible to collect for changing the location of an instrument because a customer could order his telephone removed and a few days later have another installed at a new location, thus avoiding the charge for moving.

"The amount of charge for moves and changes is caused by the fact that sixty or more separate steps must be completed between the time that the customer goes to the telephone office to order his service and the time when he has his telephone installed and tested, and is entered on the records of the company for customer service with his name in the directory with his own number." *Re Interstate Util. Co. (Idaho)*, P.U.R. 1924A, 197; *Re Mountain States T. & T. Co. (Ariz.)*, P.U.R. 1925B, 640; *Re Suisan & Green Valley Tel. Co. (Cal.)*, P.U.R. 1923A,

602; *Re Cortland Tel. Co. (Neb.)*, P.U.R. 1933E, 449; *Re New York Tel. Co. (N.Y. 1936)*, 14 P.U.R. (N.S.) 443.

Public Pay Stations.—Telephone stations for public use are installed in bus and train passenger stations, hotels, lobbies of office buildings, etc. These are public pay stations, *i.e.*, they are equipped with coin-box telephones, and the party calling is required to deposit the proper amount upon securing the party called. Since the telephone company cannot be expected indiscriminately to install such public pay stations, as, for example, in a small commercial establishment where the revenue from such calls would be very small, the storekeeper in such instances is required to guarantee a minimum amount of revenue if he desires such a telephone in his establishment, and arrangements are made to compensate him in case the amount received from calls made exceeds the minimum amount guaranteed by the storekeeper. A considerable loss is experienced from such stations from the use of slugs instead of coins and of theft of the coin box when it is not located within sight of some responsible person at all times.

Commercial Stations.—Telephones in business establishments may be divided first into those having a single instrument or possibly an instrument and one or more extensions under the same telephone listing and second into those having a number of telephone instruments either with or without a switchboard. The installation with a switchboard is known as a "private branch exchange," designated as a P.B.X. system, requiring the use of one or more operators. The rate for the first of these services is higher than that for residence service requiring the same number of instruments. The reason for the higher rate is twofold. In the first place, there are more calls to be handled from the average business telephone than from the residence phone; in the second place, one of the principal values of the business service is for its incoming calls rather than for the outgoing calls. Many of these incoming calls are outgoing calls from residence stations placing orders with the business subscriber, and for that reason the commercial subscriber can afford to pay a higher rate than that measured by the number of completed outgoing calls. This can readily be recognized when it is remembered that most of the daily use of the telephones of physicians and other commercial subscribers, such as grocers, meat dealers, and others

engaged in the services and necessities of life, are from subscribers in residences. "A telephone rate schedule should contain differentials between business and residence service, between desk-set equipment and wall-set equipment, and between individual and multi-party line service." *Re Suisan & Green Valley Tel. Co., supra.*

Since the P.B.X. service requires one or more trained operators to handle interdepartmental calls within the establishment as well as incoming and outgoing calls from the switchboard, the wages of such operators are paid by the customer. The rate for such service must cover such expense and the fixed and operating expense of each instrument, the switchboard, and the trunks (circuits) from this switchboard to the exchange of the telephone company. Some of these trunks may permit service in both directions, and others may be limited to calls in one direction only, the charge for two-way service trunks being higher than that for one-way service. In small private-branch exchanges, the operator may render service other than that of operating the switchboard, such as information service and some secretarial service.

A private branch exchange includes the switchboard of proper size on the subscriber's premises with the required number of stations connected to such board. This system is connected to the company's central office by means of the necessary number of pairs of wires called trunks.—*Re New York Tel. Co. (N.Y.)*, P.U.R. 1923B, 545.

The hotel P.B.X. is a special variety of commercial service, in which each room is furnished with an instrument connected with the switchboard in the office of the hotel. All internal calls are handled through the hotel switchboard without charge. A call from a room to any outside station in the city is charged for at 5 or 10 cents per call, but all incoming calls are handled free. Long-distance toll calls are also made from room instruments through the hotel exchange and charged at the regular toll rates for the given class of call.

A proper relation between charges for hotel private branch exchanges and the value of the service and cost of the equipment may be secured by graduating the charges in accordance with the number of extension lines.—*Public Service Comm. v. Mountain States T. & T. Co. (Mont.)*, P.U.R. 1927B, 193; *Re New England T. & T. Co. (N.H.)*, P.U.R.

1930A, 59; *Hotel Pfister v. Wisconsin Tel. Co. (Wis.)*, P.U.R. 1932B, 8; *Jefferson Hotel Co. v. Southwestern Bell Tel. Co. (Mo.)*, 1936, 15 P.U.R. (n.s.) 265.

Confusion sometimes occurs in classification of telephones between residence and commercial where the telephone is installed in the residence but is used for commercial as well as for residence calls. Some cases are easily classified as residence telephones and others as commercial telephones by the class and number of calls.¹ Other cases are more difficult to classify. The following citations refer to several cases of this nature.

"The addition of a word such as 'physician,' 'surgeon,' 'veterinarian,' 'osteopath,' 'chiropractor,' 'nurse,' 'attorney,' or the addition of such titles as 'Prof.,' 'Rev.,' or 'Dr.,' by way of identification ought to have no bearing on whether the person's telephone should be classed as a business or residence telephone, since this is a matter of convenience to the public who uses the telephone system rather than a benefit to the subscriber with whose name the word of identification is used." *Burlington v. New England Tel. Co. (Vt.)*, P.U.R. 1922D, 788. "The proper classification of telephone service depends entirely upon the use of the telephone, and not upon its location." *Re Centralia Tel. Co. (Kan.)*, P.U.R. 1916C, 421.

Rural Rates and Switching Charges.—Rural areas are served either by branch lines from the nearest town or city or else from independent local companies or rural co-operative companies mutually owned by the subscribers. In the latter case the lines are constructed by these mutual companies for the use of the stockholders who are also the subscribers. These systems are connected to the nearest town or city exchange and through this connection with long-distance lines of all other companies. The laws of most states require that a physical connection be made when requested at the nearest point and that long-distance service be rendered. Where such service is rendered, the company to whose exchange these lines are connected requires a switching charge for handling all calls to and from these rural lines. In addition, the exchange requires certain minimum standards of

¹ *Stancell v. Hope Independent Tel. Co. (Ind.)*, P.U.R. 1926E, 259; *Re Somerville Medical Soc. (Mass.)*, P.U.R. 1921D, 304; *Columbia Tel. Co. v. Atkinson*, 271 Mo. 28, 195 S.W. 741, P.U.R. 1917F, 27; *Sullivan Tel. Co. (Ind.)*, P.U.R. 1930E, 282; *Re Southwestern Bell Tel. Co. (Mo.)*, P.U.R. 1930E, 208.

maintenance for these rural lines. These switching charges are paid by the mutual companies and then collected from their subscribers. In like manner, the exchanges doing the switching are held responsible for long-distance charges of all lines connected to their switchboards and also collect these charges from the mutual companies. The rates for switching charges are based on the cost of handling such business.

Rural service is usually on a party-line basis in order to save expense in building long lines for each subscriber. The charge is based on the number of telephones on a given length of line and an "over radius" charge for all subscribers who are situated at a considerable distance from the regular lines of the company. Where metallic-circuit service is required on account of inductive interference from power lines, the cost of such installations is greater than the single-line and ground-return circuit usually used. However, the service is much better over such lines. Whereas not more than four-party service is held to be good practice in city telephone systems in residence areas, as many as eight or ten subscribers and sometimes more are connected to a single line in rural areas. In consequence, the service is not of so high a class over such lines as in urban districts.

"Telephone patrons on farmers' lines are equally responsible with every other subscriber for the expenses incurred in operating the exchange with which they are connected, and the necessity of greater plant investment per circuit in farmer's lines and the maintenance of the extra length of line must be taken into consideration." *Re Pacific T. & T. Co. (Ore.)*, P.U.R. 1922C, 248. "Excess radius charge for remotely situated telephone subscribers should be computed on an air-line basis rather than upon the distance actually traversed by the wires." *Re Door County Tel. Co. (Wis.)*, P.U.R. 1931D, 173. "A general call is a certain specified signal calling all subscribers on the line at one time." *Re Viola Tel. Co. (Minn.)*, P.U.R. 1919F, 47; *Re Farmers & Merchants Tel. Co. (Neb.)*, P.U.R. 1920B, 956. "The subscriber of one company desiring toll service over the lines of another company must pay in addition to the rate charged the patrons of the latter company a reasonable compensation for the additional service." *Morrill v. Wisconsin Tel. Co. (Wis.)*, P.U.R. 1917C, 339. "Another line charge is a charge made by a terminating company in addition to the public toll rate between two exchanges which results in a higher rate for inbound than is charged for a similar outbound message." *North Dakota Board of R. Comm. v. Abercrombie Tel. Co. (N.D.)*, P.U.R. 1923E,

467. "A telephone company is justified in charging an increased rate for telegrams relayed over its toll lines, since such service contains elements of hazard due to implied liability which do not pertain to the ordinary telephone business." *Re Arizona E. Tel. Co. (Ariz.)*, P.U.R. 1920E, 695.

Long-distance or Toll Rates.—Charges for long-distance calls take into consideration two elements of cost, *viz.*, the distance and the time consumed in making the calls. Charges are made for various classes of toll service such as person-to-person and station-to-station calls, and these again are dependent upon the time of day when the calls are placed. The person-to-person call commands the highest rate, because, as a rule, more time is consumed in locating the person wanted. If a particular telephone only is desired by the party calling (station-to-station calls), much less time is consumed in securing such connection. The charges for long-distance calls have been materially reduced in the past several years, especially those calls made during the night time and during holidays and Sundays, when not much use is made of long-distance lines for commercial purposes. The reduction in such toll charges has come about largely because of the development in the telephone art whereby a great many more messages can be transmitted over the same pair of wires than formerly. The revenues obtained by telephone companies for toll service are subject to great fluctuations, dependent upon business conditions. Furthermore, they are subject to the value placed upon the service by the subscriber, and this value is generally much greater during boom periods than during depressions. It seems only reasonable that each exchange should contribute some revenue toward the operation and maintenance of toll lines, because any customer in any community has the privilege of making a long-distance call and something should be paid for such privilege. However, the values and costs of toll service must be separated at each exchange on some proper basis. Whether this allocation should be stopped at the switchboard or whether a portion of it should be allocated to the subscriber is a matter not yet thoroughly decided.¹

¹ *Re Twin-City Tel. Co. (Wis.)*, P.U.R. 1924E, 379; *Re Pomona Valley T. & T. Union (Cal.)*, P.U.R. 1928B, 705; *Re Peninsular Tel. Co. (Fla.)*, P.U.R. 1934A, 30; *Public Service Comm. v. Mountain States T. & T. Co. (Mont.)*, P.U.R. 1924C, 545; *Re Mountain States T. & T. Co. (N.M.)*, P.U.R. 1923B, 352.

"We think that the plan of separating the property and the expenses at the backside of the exchange switchboard is fair and reasonable." *Re Northwestern Bell Tel. Co. (Neb.)*, P.U.R. 1923B, 112. "The present toll rates of the Wisconsin Telephone Company are based on the theory that the toll message rate should carry the cost from toll switchboard to toll switchboard and that the use of the local lines and equipment in delivering the message from toll switchboard to subscribers' station is the same sort of use that is involved in regular exchange service, such, for example, as that furnished in the delivery of a telegraph message from the telegraph office to the subscribers' station." *Re Rock County Farmers Tel. Co. (Wis.)*, P.U.R. 1925A, 178. The opposite opinion was given in *Re Missouri Kansas Tel. Co. (Kan.)*, P.U.R. 1918C, 777, and sustained in *Hopkins v. Southwestern Bell Tel. Co.*, 115 Kan. 236, 233 Pac. 771, P.U.R. 1924D, 388.

"Telephone toll rates were established on the air-line distance basis notwithstanding the fact that toll points were separated by large bodies of water across which there were no cables, thereby necessitating a longer land route for messages. The company has contended on rates based on turning points." *Re Southern Bell T. & T. Co. (Fla. 1933)*, 1 P.U.R. (N.S.) 30. See also *Memphis v. Southern T. & T. Co. (Tenn. 1935)*, 6 P.U.R. (N.S.) 464.

Street-railway Rates. *General.*—The modern street-railway system is the outgrowth of many years of development and evolution. The earliest forms of surface transportation using tracks in city streets were small single-truck cars drawn by horses or mules. These cars ran on light rails fastened to light wooden ties along the main streets of the cities. The horses wore out the street surface and pavement between the rails and to a distance of one foot or more beyond the outside rails. In order to make the streets more passable for other vehicular traffic, ordinances were passed in some of these cities requiring the railway companies to pave the streets between and a short distance beyond the rails. These ordinances were followed in many instances by state laws making the same requirement mandatory. This custom has persisted even with the advent of self-propelled street cars, and the cost of such paving represents a large capital outlay. Such an outlay may be considered a form of franchise tax on the railway companies since they are forced to furnish that portion of the street improvements free of charge to the city. Why the streetcar riders should pay for such pavement from which they receive little benefit is difficult to answer.

In some of the larger cities, where the traffic was heaviest, it was found impossible to meet the needs of traffic by the use of slow horse-drawn cars, and other systems were tried. One of the early successful systems was that of the cable-drawn car. In this system, a cable driven by mechanical power was laid in a channel between the rails and below the street level. A mechanical grip supplied to each car or tractor was attached to a plow passing through a narrow slot and gripping the cable to drive the cars. By this means, heavier cars could be drawn at a higher speed or else the lighter horse cars could be drawn behind a tractor from gathering points and redistributed to other points along the circuit made by these power cables. About 1888, the first practical electrically driven streetcar was operated. From that time on, the slower horse cars and cable cars were rapidly displaced by these newer, faster, and more comfortable means of transportation.

The fare or rate system for street railways is the easiest of any rate structure to determine, for it is usually a flat rate. The capital costs are determined by a valuation of the property, and the operating expenses can be easily ascertained, for they do not need to be allocated among different classes of customers. The earliest and most common charge was the 5-cent fare, which became almost universal during horse-car days. This fare met the expenses of most street railways with the usual allowed return on the investment. It was felt that the fare must be a single coin on account of the ease of making change and the freedom from errors. As a system grew with many branches leading out into residential areas from a central system in the business and industrial districts, it was found necessary to provide some means for a single fare for any through ride within the city limits, and transfers were provided permitting a person to take the next car going in the proper direction on an intersecting line from the junction point.¹ These transfers could be issued by the conductors or by transfer men at junction points. "On a distance tariff system of street railway fares no policy of fare collection appears to be as practical as a single collection for the whole ride at the time the passenger is leaving the car."

¹ *Catasauqua v. Lehigh Valley Traction Co. (Pa.)*, P.U.R. 1918B, 716; *Ray v. Pacific E. R. Co. (Cal.)*, P.U.R. 1916A, 83; *Re Los Angeles R. Corp. (Cal.)*, P.U.R. 1922A, 66; *Re Nashville R. & L. Co. (Tenn.)*, P.U.R. 1920C, 1.

With the growth of the areas of some cities including suburban areas, it was found necessary to limit the distance that could be traveled on a single fare. Zone systems were installed in many cities to accomplish this result and to permit the street railway to earn a larger return to meet increasing expenses caused by greater investment for heavier equipment and more expensive roadbed, together with the greater length of haul. Numerous schemes were tried for fixing the limits of these zones and collecting a fare proportional to the length of haul for each passenger. Some of these schemes consisted of the issuance of a ticket at the time of entrance of the passenger, showing the zone in which the trip commenced, and collecting this ticket at the time of leaving together with the proper fare, the fare being determined by the number of zones covered. Complications arose in connection with transfers within or between zones as well as from passengers living just beyond the limit of any zone whenever the zone line fell in a built-up residential area.

A suburban street railway rider, who enjoys the advantages of a greater load factor because of the suburban cars carrying city passengers during off-peak hours, and who also enjoys transfer privileges as city passengers, must bear some portion of the more expensive tripper service of rush hours although such service is mainly consigned to the urban districts.—*Re Milwaukee E. R. & L. Co. (Wis.)*, P.U.R. 1920A, 361.

School children have been carried on most street-railway systems at a lower fare than that charged adults. This has usually been fixed at half fare with the requirement of the purchase of passes or tickets. A difficulty arises in the enforcement of such fares in determining the age limits of such children and the time limits within which such lower fare tickets and passes may be used. In the rush hours it is difficult for conductors to handle such traffic in the proper manner.

"The fare for school children on street railways should be kept as low as possible, so that no obstacle shall be placed in the way of the education of children of the poor." *Re Springfield Consol. S. R. Co. (Ill.)*, P.U.R. 1920E, 474. "The term 'school children' was held to embrace children attending public schools and those attending any school, attendance at which excuses attendance at the public school." *Re Lincoln Traction Co. (Neb.)*, P.U.R. 1920A, 328.

With increasing costs of operation and the falling off in traffic due to competition from other forms of rapid transportation such as buses and private automobiles, it became necessary soon after the World War to raise the base rate for single fares on street railways above the 5-cent limit. Base fares of 6 to 10 cents were tried, and even these fares were insufficient to save many of the smaller systems from bankruptcy. Schemes were also introduced to make the fare of the regular patron lower than that of the casual rider. Such schemes have consisted of weekly passes permitting a certain number of rides which are sufficient to take the passenger to and from his work, sale of tickets and metal tokens either on the car platform or at convenient sales places. Such lower fares for the regular passengers have been held non-discriminatory as between such passengers and the occasional rider. These tickets and passes are also of assistance in handling traffic, for they save considerable time in making change at the point of entrance or exit. In such cases the regular fare is usually put at 10 cents, so that a single coin may pay the fare, and this coin is interchangeable with the token in operating the coin meters and automatic counting machines at the entrances to the cars.

"A ticket rate lower than a street railway cash fare is proper since the steady rider should be carried at the lowest possible rate while the occasional rider should pay more in accord with the value of the service for his occasional use." *Re New York State R. (N.Y.)*, P.U.R. 1927A, 478. "The man or woman who uses street car service daily is entitled to a lower per-ride charge than the occasional rider." *Re Shreveport R. Co. (La.)*, P.U.R. 1929A, 89.

Numerous schemes have also been tried to lower the cost of operation. Since a considerable part of the cost is the pay for platform labor in operating the cars, the one-man safety cars were introduced on many of the residence and suburban runs. These cars are operated by one man who is both a motorman and a conductor. He is provided with safety devices to prevent accidents, and experience has demonstrated that there are fewer accidents in the operation of such cars than on those provided with two men without the safety devices. The crowds are handled on and off such cars nearly as rapidly as with the two-man cars.

Trackless trolley cars have been introduced in many cities. These cars require two overhead trolley wires on the streets on which they operate, but they do not require rails. The power for these cars is taken from the wires, but the cars themselves run on the same type of wheels with rubber tires as are used on buses. They are steered by a single operator and have the advantage of being able to maneuver in traffic and to take on and discharge passengers at the curb instead of in the middle of the street. Such lines can be extended on streets where there are no rails, and so the cost of maintenance of the rails and pavement is saved. Other railways have displaced their trolley cars in residential and other lighter load districts with standard buses driven by gasoline engines. In some cities, double-purpose buses are operated which can be driven by electric current taken from trolley wires on part of the trip and by gasoline engine for the remainder of the trip. Transfers are sometimes arranged between these buses and trackless trolleys to and from the standard cars that run in the more congested districts, the lighter vehicles becoming feeders for the other.

Some cities have tried many schemes to build up and maintain traffic in off-peak hours so as to keep the rolling stock of the railways in use for longer periods of the day and thus make a greater return on the investment that is necessary for the early morning and late afternoon peaks. Some of these schemes are covered in the following citation from the Milwaukee Electric Railway and Light Company case:

Ride-promotion plans in Milwaukee.

a. Unlimited weekly pass. The falling off in other cities in 1931 as compared with Milwaukee was as follows:

| | |
|---------------------------------------|------|
| Milwaukee, (July)..... | 5.1 |
| Detroit, (June)..... | 19.5 |
| Cleveland, (June)..... | 15.3 |
| Indianapolis, (July)..... | 12.3 |
| Baltimore, (July)..... | 11.1 |
| Cincinnati, (July)..... | 11.4 |
| Pittsburgh, (July)..... | 15.4 |
| Minneapolis and St. Paul, (July)..... | 10.7 |

b. Off-peak shoppers pass. This pass was sold for 75 cents—one-fourth less than the regular weekly pass—to be honored only between

the hours of 9 in the morning and 4 in the afternoon, and after 7 o'clock at night. On Saturday it was good at all times after 9 o'clock.

c. Children free on weekly pass. A tariff was filed whereby on Sundays two children under 12 years of age were permitted to ride free on the regular dollar weekly pass. An average of almost 30,000 children were carried under this plan each week during the two months it was effective.

d. Shopper-theater off-peak pass. Shortly prior to May 17, 1931, the company sought and received our permission to revive the 75-cent Christmas shoppers pass, in the form of a weekly shopper-theater pass, with like conditions as to time of use, but with the additional privilege that, on Sundays, two children of half-fare age would be carried free on such special passes. After the trial period of six weeks the pass was continued until September 6th, with an additional provision permitting two children to ride with the adult holder of the pass during any of the hours during which the special pass was good.

During the two months which this latter provision was effective the average sales of this pass were built up to 2,500 per week, whereas, for the preceding six weeks, without children free privileges, the average sales were 1,800 per week.—*Re Milwaukee E. R. & L. Co. (Wis.)*, P.U.R. 1931E, 289.

SECTION VII

SERVICE

CHAPTER XXIV

GENERAL RULES FOR SERVICE

Duty to Render Service.—Business generally has no duty to serve or to render service to the public. A business may be started, if legal, without any special permission from the state or municipality; it may charge what it will for its goods; and it may abandon the enterprise at any time. In the case of a business whose service is public in nature, permission must be obtained from the municipality and sometimes from the state to establish or to abandon the service. Such service is usually monopolistic, so that the price charged for the service cannot be fixed by competition. In many cases, certificates of convenience and necessity must be obtained from the state commission before service may be offered, and then a franchise must be obtained giving permission to operate in the particular municipality. In such cases a duty to serve the public attaches to the privilege to serve. In early cases such duty, as well as a duty to treat all alike as to rates and service, was not recognized. The early decisions bearing on this matter follow:

"A railroad company in an early English case was held to be under obligation to complete its railroad under terms of its charter, but later, it was decided that a railroad is not compelled to complete a line under a permissive charter." *York & N.M.R. Co. v. Regina*, 1 E. & B. 858, 118 Eng. Reprint 657. "The obligation of a ticker company does not rest on contract but on its duty to serve." *Smith v. Gold & Stock Teleg. Co.*, 42 Hun (N.Y.) 454. "We see no reason for subjecting the maker of gas to duties or liabilities beyond those which the manufacturer and vendors of other commodities are subjected by the rules of law." *McCune v. Norwich City Gas Co.*, 30 Conn. 521. "A gas company is not obligated to supply all persons having buildings situated

along the line of pipes, as the charter is held to be permissive and not compulsive." *Patterson Gas L. Co. v. Brady*, 27 N.J. L. Rev. 245. In a later case it ruled, "A company in accepting its charter impliedly engaged to supply all who might apply for water, and the earlier case was reversed." *Olmstead v. Proprietors of Morris Aqueduct*, 47 N.J. L. Rev. 311.

In later cases before commissions and courts, it has been ruled that a company cannot accept the profitable and reject the unprofitable part of a business;¹ that a commission cannot compel a railroad to extend its lines unless this was contracted for;² that a utility when accepting a charter must serve and continue to render service in the territory;³ that a railroad might engage in the telegraph business but if it so engages it must continue to render service;⁴ that the right of a customer to receive service from a utility is not a property right;⁵ that a utility cannot refuse a reasonable demand for service⁶ and render the service in the broadest sense;⁷ and that if a utility renders two different services such as gas and electricity, it must render either on demand even if the customer does not take the other service.⁸

Because a public utility is a business enjoying a monopoly in its field, there is no other place where the customers may purchase the service. The utility is charged with treating all customers alike and of serving all who request service in the particular area in which it has held itself out to render service, provided they come within the category of the utility's extension policy. The patrons must be treated alike, both as to rates and as to service. These duties may be enforced by commissions and courts. It is also good business policy to build up good will among customers rather than to be forced to render the proper service. However, there may be certain border-line cases where

¹ *Brown v. United R. & E. Co.*, 4 Md. P.S.C. 441.

² *Merrill v. Merrill R. & L. Co.*, 5 Wis. R.C.R. 418.

³ *Sawyer v. Mayes* (Ark.), P.U.R. 1920D, 793.

⁴ *Conrad v. Western Union Teleg. Co. (Ind.)*, P.U.R. 1920E, 499.

⁵ *United States L. & H. Corp. v. Niagara Falls Gas & E. Co.*, 47 F. (2d) 567, P.U.R. 1931B, 127.

⁶ *States Metal Co. v. Chatham E.L.H. & P. Co. (N.Y. 2d Dist.)*, P.U.R. 1919A, 750.

⁷ *Re San Joaquin L. & P. Co. (Cal.)*, P.U.R. 1920D, 940.

⁸ *Re Union E. L. & P. Co. (Mo.)*, P.U.R. 1932B, 1.

the judgment of the utility is not in accordance with that of the customers, and courts or commissions must deal with such cases to see that equity is given to all concerned.¹

It is impossible for any public utility to give perfect service at all times to all its customers. Various employees of the utility, each of whom is an agent of the company, come into contact with customers. The company must have certain rules for its own employees as well as for the public that is being served. Interpretation of these rules should be uniform, but with so many customers and so many employees differences are bound to occur. For this reason, the utility must be willing to hear complaints and to adjust differences. In its decisions of such cases, the one in charge of hearing complaints must be able to see the viewpoint of the customer as well as that of the company and to adjust complaints so that no unlawful discrimination may exist. Some of these contacts with customers will be discussed more in detail in later sections. These will cover failure to serve due to proper excuses offered by the utility and refusal of service because of acts of the individual patrons.

When service is rendered, the quality of the service must be such as is customary in communities of the same class in the same or other states. Complaints of poor service that are not properly handled by the officers of the utility or in which differences of opinion exist may be taken before the commission for adjustment.

¹ *Winona & St. Peter R. Co. v. Blake*, 94 U.S. 180; *Cedar Rapids Gas L. Co. v. Cedar Rapids*, 144 Iowa 426, 120 N.W. 966; *Roebuck v. Southwestern Bell Tel. Co. (Okla.)*, P.U.R. 1918D, 210; *Re Staten Island R. Transit Co. (N.Y. 1st Dist.)*, P.U.R. 1918F, 453; *States Metal Co. v. Chatham E.L.H. & P. Co.*, *supra*; *Re Central Illinois Pub. Service Co. (Ill.)*, P.U.R. 1921B, 7; *State ex rel. Ozark P. & Water Co. v. Public Service Comm.* 287 Mo. 522, P.U.R. 1921D, 333; *Re Los Angeles R. Co. (Cal.)*, P.U.R. 1922A, 66; *Re Potosi (Wis.)*, P.U.R. 1925D, 354; *Oklahoma Natural Gas Co. v. Corporation Comm.* 111 Okla. 6, 237 Pac. 838, P.U.R. 1926A, 554; *City of Lee's Summit v. Independence Water Co. (Mo.)*, P.U.R. 1928E, 13; *Cape Girardeau v. Missouri Pub. Util. Co. (Mo.)*, P.U.R. 1930D, 126; *Churchill v. Winthrop & W. L. & P. Co. (Maine)*, P.U.R. 1916F, 752; *Broad River P. Co. v. South Carolina*, 280 U.S. 551, 74 L. ed. 609, 50 Sup. Ct. 162, P.U.R. 1930C, 234; *City of Fort Collins v. Public Service Comm. (Colo. 1935)*, 8 P.U.R. (N.S.) 362; *State ex rel. Armstrong v. Waseca*, 122 Minn. 348, 142 N.W. 319; *Re Eagle River L. & Water Co. (Wis.)*, P.U.R. 1925E, 671.

Where no commission exists for the given class of utility, such cases are heard by the courts. "The public is reasonably patient with poor service if it is accompanied with courteous treatment, or it will usually stand discourteous treatment tempered with good service, but when you hand him poor service and discourtesy together, he can reasonably be expected to be dissatisfied."¹

Commissions have general powers to regulate public utilities. This extends to the control of service rendered by the utility, except as to those matters which are entirely within the management of the officers of the utility. The commission cannot take the place of the management; it can only settle disagreements between the customers and the management and see to the carrying out of provisions in franchises and contracts. In some states this also extends to municipally owned utilities in their dealings with the customers.²

Failure or Refusal to Serve.—Failure or refusal of a utility to serve customers covers a wide range of causes. As a general rule, the utility is only too glad to render service in order to increase its business. However, it is the duty of the utility management to protect its customers from service in discrimination to others. Causes for refusal to serve range from lack of return, strikes and labor troubles, emergencies growing out of war or economic disturbances, cutting off the supply of fuel or other needs of the utility, acts of patrons in refusal to pay bills, theft or diversion of service without pay to others, illegal use of the product, competitive conditions where other service is available to patrons, short-

¹ *Re San Joaquin L. & P. Corp.* (Cal.), P.U.R. 1920D, 940; *Concord v. Concord E. R. Co.* (N.H.), P.U.R. 1921E, 763; *Public Service Comm. v. Billings Gas Co.* (Mont.), P.U.R. 1926D, 777; *Re Hope Ind. Tel. Co.* (Ind.), P.U.R. 1917C, 449.

² *Re Rockport (Me.)*, P.U.R. 1920A, 72; *E. Diehl Agency v. New York Tel. Co.* (N.Y.), P.U.R. 1928D, 803; *Richland Gas Co. v. Rayville Gas Co.* (La.), P.U.R. 1929D, 358; *Cleveland v. East Ohio Gas Co.*, 34 Ohio App. 97, P.U.R. 1929E, 29; *State ex rel. Kansas City Pub. Service Co. v. Latshaw*, 325 Mo. 909, P.U.R. 1930D, 348; *Re Brooklyn Edison Co.* (N.Y.), P.U.R. 1931E, 418; *City of St. Paul v. Tri-State T. & T. Co.*, 193 Minn. 484 (1935), 258 N.W. 822; reversing the lower court and affirming the commission; *Re Amenita Tel. Co.* (N.D.), P.U.R. 1929D, 613; *Atchison, T. & S.F.R. Co. v. R. Comm.*, 212 Cal. 370, 288 Pac. 775, P.U.R. 1928B, 582; *Dunlap v. Clarendon Hills Water Co.* (Ill.), P.U.R. 1928B, 582; *Re Omaha & C.B.Q.R. Co.* (Neb.), P.U.R. 1930D, 282; *Public Service Comm. v. Central Missouri Tel. Co.* (Mo.), P.U.R. 1931D, 166.

age of supply of gas or water, and other causes. These will be discussed in detail in the following sections.¹

The mere fact that the earnings of a utility are not sufficient to pay dividends is not an excuse for poor service. The utility has both the right and duty to ask for higher rates, if they are necessary, in order to meet operating expenses and fixed charges and to provide for a net return rather than to render poor service on account of lack of maintenance or other causes. Poor service does not lead to increased income, for customers are more willing to pay higher rates for adequate service than to receive poor or indifferent service. If it is impossible to secure proper income from increased rates, the utility then has the opportunity to ask for permission to abandon the service to all. The mere loss on a particular kind of service does not excuse the utility from rendering service, if the return as a whole is adequate;² a return of approximately 10 per cent plus the flat rate charges must be expected from extensions;³ unreasonable damages for street excavations ordered by a city may excuse the utility,⁴ as well as expensive installations asked for stand-by purposes.⁵ A railroad must be expected to erect suitable depots;⁶ a utility must first rehabilitate its system before the commission can grant relief in the form of rates.⁷ The following citation applies to railroads:

A Commission order requiring passenger service on a branch line where only freight service had been rendered was held to be constitutional although the passenger service so ordered, if separately considered, would entail a loss, where the branch line under the local law had been devoted to passenger as well as freight service, and it did not appear

¹ *Glass v. Del Mar L. & P. Co.*, 2 Cal. R.C.R. 335; *Veach v. Centra Ill. Pub. Service Co. (Ill.)*, P.U.R. 1920C, 221; *Illinois Commerce Comm. v. Mount Carmel Pub. Util. Co. (Ill.)*, P.U.R. 1923E, 264.

² *Puget Sound Traction L. & P. Co. v. Public Service Comm.*, 100 Wash. 329, P.U.R. 1918C, 662.

³ *Re Rules & Practices of Rio (Wis.)*, P.U.R. 1928C, 464.

⁴ *Bluefield v. Bluefield Waterworks & Improvement Ass'n (W. Va.)*, P.U.R. 1924A, 573.

⁵ *Re East Bay Water Co. (Cal.)*, P.U.R. 1920B, 127.

⁶ *Rocky Hill v. Pennsylvania R. Co.*, 1 N.J. P.U.C. 384.

⁷ *Public Service Comm. v. Rogersville Tel. Co. (Ala.)*, P.U.R. 1931A, 387; *Re Colonial Trust Co. (Idaho)*, P.U.R. 1928D, 628; *Betts v. Morris Aqueduct Co. (N.J.)*, P.U.R. 1916B, 71.

that the entire line was unprofitable.—*Chesapeake & Ohio R. Co. v. Public Service Comm.*, 242 U.S. 603, 61 L. ed. 520, 37 Sup. Ct. 234.

During a period of war or of other emergency, where it may be impossible to obtain materials, labor, and supplies to make extensions or to carry on the operations of the utility at full demand, the company is often excused from rendering full service. In the case of shortage of fuel, due to confiscation by the government or to strikes and other disturbances not under the control of the company, full service is not expected. Contracts with customers usually have a provision exempting the utility from damages in case of failure of supply due to causes beyond the utility's control.¹

As a general rule, a public utility is not obliged to furnish service to another person or utility which sells service to others in competition with the utility. This is as true of breakdown service as of any other kind. The service to the owner of one or more apartment houses in the same city block is sometimes classed under this same heading if he remeters and resells the service to others in the same block or apartment building.²

Service to a state rural electrification authority was ordered by the South Carolina Commission where a utility company objected to furnishing such service to a competitive organization. The Commission thought that the authority under its present and contemplated program would not be operated in substantial competition with the company, but in any event it was the opinion of the Commission that the company has no exclusive monopoly for the conduct of the electric business in the territory expected to be served by the authority.—*Re Broad River P. Co.* (S.C. 1936), 11 P.U.R. (n.s.) 66. See also *North Carolina Pub. Service Co. v. Southern P. Co.* (U.S. C.C.A.), P.U.R. 1923A, 289; *Re Madison Gas & E. Co.* (Wis. 1936), 15 P.U.R. (n.s.) 358.

When other service is available in the territory, it is usual for the utilities to divide the territory between them rather than to

¹ *Petts v. Missouri Pacific R. Co.* (Mo.), P.U.R. 1918B, 345; *Re United R. & E. Co.* (Md.), P.U.R. 1920A, 1, 24.

² *Frankel Bros. v. New York Edison Co.*, 4 P.S.C. N.Y. (1st Dist.) 272; *Salisbury & S.R.Co. v. Southern P. Co.*, 179 N.C. 330, 102 S.E. 625, P.U.R. 1920D, 560; *Rogers Iron Works v. Joplin Water Co.* (Mo.), P.U.R. 1928E, 260; *Fairfield v. Great Western P. Co.* (Cal.), P.U.R. 1930E, 8; *State ex rel. Fletcher v. Northwestern Bell Tel. Co.*, 214 Iowa 1100, 240 N.W. 252, P.U.R. 1932C, 42; *Re Gunnison Valley P. Co.* (Colo.), P.U.R. 1933A, 237; *Fulton v. Panhandle Eastern Pipe Line Co.* (Mo.), P.U.R. 1933A, 256.

establish competitive rates. The determination of which of two available utilities should furnish service to a given customer is usually decided by the position of the customer in regard to the dividing line. However, in the case of telephone service, "community of interests" may govern. Thus, if the customer desires connection with a certain line because it connects with his county seat or with a near-by city in which his principal business interests are located, he may desire the connection to avoid a toll charge on his business calls. In such a case, the commission usually orders that the utility give the customer the service that is most convenient and economical for the customer.¹

A utility may refuse to render service to equipment installed in such a manner as to be dangerous to the consumer. Cities usually require inspection of all services before the utility may connect. However, this does not apply to equipment attached to outlets not inspected by the city. Gas stoves and appliances connected by rubber tubing are considered to be dangerous, and, in most cities, gas utilities are forbidden to connect to such appliances except by means of metal pipe connections. Dangerous electric appliances are forbidden to be used, and electrical utilities may refuse service to such equipment. The electrical equipment may be for the wrong voltage, for alternating current where only direct current is available, or for alternating current of the wrong frequency.²

Where service is furnished at a flat rate, the diversion to others is the same as a theft of service by those who do not pay for the service. Where the service is metered, the diversion to others usually reduces the income of the utility, because of the rate structure, in which a greater volume sold to one customer results

¹ Central New York T. & T. Co. v. Averill, 199 N.Y. 128; modifying 129 App. Div. 752; Re Interurban Tel. Co. (Wis.), P.U.R. 1919D, 800; Huntington Brick & Tile Co. v. United Fuel Gas Co. (W. Va.), P.U.R. 1927B, 173; Re Arley Darnielle (Idaho), P.U.R. 1928E, 211; Braun Lumber Co. v. Bell Tel. Co. (Pa.), P.U.R. 1931A, 19; Town of Hempstead v. Nassau & Suffolk Ltg. Co. (N.Y.), P.U.R. 1929C, 446; Salisbury & S. R. Co. v. Southern P. Co., 179 N.C. 330, 102 S.E. 625, P.U.R. 1920D, 560; Re Missouri City Tel. Co. (Mo.), P.U.R. 1929B, 810; People ex rel. Percival v. Public Service Comm., 163 App. Div. 705, 148 N.Y. Supp. 583.

² Nichols on Public Utility Service and Discrimination, p. 189; State ex rel. W. J. Armstrong v. Waseca, 122 Minn. 348, 142 N.W. 319; Wood v. Public Service E. & Gas Co. (N.J.), P.U.R. 1928B, 609.

in a lower average rate. A telephone paid for by one individual and used by several families is discriminatory as between consumers; and such use of the telephone should be forbidden.¹

Customers sometimes connect to the service lines of utility companies ahead of the meters or provide some form of "jumper" around this meter. This form of theft is looked upon by the law in the same way as any other theft. When the company has discovered that a customer is diverting service around the meter, it has the right to discontinue the service. When the meter has been damaged or some method has been used by the customer to cause the meter to register less than the true amount, the utility usually confronts the customer with the proof of theft. Before the company restores service to him, the customer is required to pay for the repair of the meter, for resetting the meter, including some device to prevent future thefts, and also to pay for the service that has been diverted. Theft of service is punishable under both civil and criminal law. However, companies seldom take such action, for the cost of collection through the courts is usually greater than the value of the service lost. The punishment by loss of service to the customer is usually great enough to prevent future theft. If the meter is on the property of the customer, and he is the only one responsible for access to the place where the meter is located, the presence of "jumpers" or other devices used to steal service is taken as sufficient evidence of criminal knowledge of the act. Theft is often discovered by comparison of bills for present with past service and, in the case of electric utilities, by the use of a test meter located off the premises of the customer, usually on the pole from which the wires are extended to the customer's premises.²

¹ Public Service Comm. v. Water Util. (Mont.), P.U.R. 1915E, 866; Gary L. & Water Co. v. Christ (Ind.), P.U.R. 1921C, 355; Johnson v. Mountain States T. & T. Co., 48 Utah 339, 159 Pac. 526, P.U.R. 1916F, 585; Re Lincoln T. & T. Co. (Neb.), P.U.R. 1916D, 416; Honerkamp v. St. Louis County Water Co. (Mo.), P.U.R. 1931D, 487.

² Bertram v. Pacific Gas & E. Co. (Ariz.), P.U.R. 1916C, 410; Handelman v. Union E. L. & P. Co. (Mo.), P.U.R. 1928A, 94; *Id.*, P.U.R. 1930D, 446; Hoberg v. New York Edison Co., 258 N.Y. Supp. 701, P.U.R. 1932C, 38; Eff-Ess, Inc. v. New York Edison Co., 237 App. Div. 315, 261 N.Y. Supp. 126, P.U.R. 1933B, 256; Bartman v. Wisconsin-Michigan Power Co., 214 Wis. 608 (1934), 3 P.U.R. (N.S.) 144; Re Union E. L. & P. Co. (Mo.), P.U.R. 1930E, 359; Re Philadelphia E. Co. (Pa.), P.U.R. 1933B, 338; *Id.* (Pa. 1934), 2 P.U.R. (N.S.) 452.

Use of improper language by patrons of a telephone utility has been held cause for removal of the telephone and discontinuance of further service. In such removal, a single instance of improper language is held not to be of sufficient moment, but habitual use is held to be inexcusable. Restoration of service in such instances is made only on promise of the customer to desist in the future from such practice and payment for the reconnection of service.¹

When the law forbids certain practices as illegal, a public utility should not furnish service to patrons indulging in such practices. When the utility knowingly lends service and help to such patrons, it is criminally liable for the abetting of crime. When the utility is innocent as to the patron's business, the service may be removed by the police or under their direction without penalty to the utility.²

A public utility must use more than ordinary care in the collection of its bills. Any losses from outstanding uncollected bills have to be met by other customers if they are not paid by the particular customer. For this reason, a utility may discontinue service³ to those who are in arrears in the payment of their bills. However, this does not extend to the collection of bills for merchandise,⁴ and the utility has no more authority or protection in the collection of such bills than has any other merchant.⁵ The utility is required to publish its rules in regard to penalties for nonpayment and to give ample further warning before disconnecting the service. The first of these conditions is usually met by printing the penalty for nonpayment on each bill rendered; the second is usually met by mailing a notice to the customer before disconnecting the service. In the case of a disputed bill,⁶ the

¹ *Re Mann* (Mass.), P.U.R. 1918B, 146; *Minerva & C. Transit Co. v. Farmers & Merchants Tel. Co.* (Ohio), P.U.R. 1920C, 801; *Pugh v. City Tel. Ass'n* 8 Ohio Dec. Reprint 644; *Edwards v. Ashland Tel. Co.* (Ill.), P.U.R. 1918C, 891; *Osmundsen v. Farmers Union Tel. Co.* (Wis.), P.U.R. 1919F, 387; *Re Pulaski Merchants & Farmers Tel. Co.*, 10 Wis. R.C.R. 558.

² *State v. Western Union Tele. Co.*, 160 Ark. 444, 254 S.W. 838; *Cullen v. New York Tel. Co.*, 106 App. Div. 250, 94 N.Y. Supp. 290; *Bryant v. Western Union Tele. Co.*, 17 Fed. 825.

³ *McCammon v. Harkness* (Idaho), P.U.R. 1915E, 558; *Merrill v. Livermore Falls L. & P. Co.*, 117 Me. 523, P.U.R. 1919B, 546.

⁴ *Seattle v. Seattle L. Co.* (Wash.), P.U.R. 1915B, 135.

⁵ *Prescott v. Camden & Rockland Water Co. (Me.)*, P.U.R. 1928A, 590.

⁶ *Magill v. Springfield Consol. Water Co. (Pa.)*, P.U.R. 1923A, 187.

utility has no right to disconnect until adjustment is tried before the commission or a court.¹ The amount of the bill for service is usually too small for collection before courts, for the fees involved in the collection are in most cases greater than the bill. For this reason, the utility is given the authority to disconnect the service.² The Supreme Court has approved the practice of disconnection for nonpayment in the following:

A regulation providing that service should not be furnished to any person in arrears for past service which had not been declared unreasonable by statute, but had been uniformly and impartially enforced for many years and was impartially applied, was regarded by the United States Supreme Court as valid. Mr. Justice van Devanter, delivering the opinion of the court, said that while some differences of opinion on the subject were disclosed in reported decisions, the weight of authority was on that side. It was also supported in reason, for not only are rates fixed and regulated in the expectation that they will be paid, but the company's liability properly to serve the public largely depends upon their prompt payment. They are usually only a few dollars a month, and the expense incident to collecting them by legal processes would be almost prohibitive.—*Southwestern T. & T. Co. v. Danaher*, 238 U.S. 482, 59 L. ed. 1419, 35 Sup.Ct. 886, P.U.R. 1915D, 571.

Bills for service rendered to former owners or occupants of property are not a lien on that property, and the utility cannot refuse service to new owners or lessees of the property until such bills are paid. This ruling is as true of service from municipally owned utilities as of those privately owned.³ This is expressed in the following citation:

¹ *Atlanta v. McJunkin*, 163 Ga. 131, 135 S.E. 498, P.U.R. 1927B, 520; *Wood v. Public Service E. & Gas Co. (N.J.)*, P.U.R. 1928B, 609.

² *Poole v. Paris Mountain Water Co.*, 81 S.C. 438, 62 S.E. 874; *Minneapolis G. E. Co. v. Minneapolis*, 194 Fed. 215; *Clark v. Utica Gas & E. Co. (N.Y.)*, P.U.R. 1928E, 657; *Re Cheyenne L. Fuel & P. Co. (Wyo.)*, P.U.R. 1930E, 114; *Re Union E. L. Co. (Mo.)*, P.U.R. 1932B, 1; *Re Hackensack Water Co. (N.J.)*, P.U.R. 1933E, 343; *Jones v. Nashville*, 109 Tenn. 550, 72 S.W. 985; *Webb City v. Missouri Pub. Util. Co. (Mo.)*, P.U.R. 1921D, 348; *Lucky, Platt & Co. v. Central Hudson Gas & E. Corp. (N.Y.)*, P.U.R. 1932B, 165; *Risley v. Redstone Independent Tel. Co. (Mich.)*, P.U.R. 1920C, 878.

³ *Re Guarantee and Deposit Rules and Disconnect Procedure (Wis. 1936)*, 11 P.U.R. (n.s.) 439; *Kane v. Roxy Theaters Corp. (U.S. C.C.A.)*, P.U.R. 1933E, 439; *Colbrese v. Glendive (Mont.)*, P.U.R. 1925D, 579; *Public Service Comm. v. Tonopah Sewer & Drainage Co. (Nev.)*, P.U.R.

In the absence of statutory authority, a municipal corporation cannot make delinquent water rentals a lien or encumbrance on premises against a subsequent owner or occupant. A requirement that such rentals be paid by a subsequent occupant before rendering service is, therefore, unreasonable.—*Linne v. Bredes*, 43 Wash. 540, 86 Pac. 858.

Inability to Serve.—A number of valid excuses may be offered by a public utility for inability to render service.¹ These excuses must be for reasons beyond the power of the utility itself to overcome,² such as acts of employees while on strike, failure of the state or city to protect the property, or to make the streets safe for passage of vehicles owned by the utility.³ As a general rule, it should be the object of the utility to render service of the highest order and continuous in nature, as well as service that is up to the standards set by the rules of the commission and of customs of other similar utilities in cities of comparable size.

Financial inability to render service of a kind that requires making extensions or of increasing the capacity of the station or transmission equipment is sometimes advanced as a temporary or permanent excuse for failure to render service. In the case of municipal enterprises or rural co-operative lines, this excuse is usually held to be valid, but in the case of privately owned plants the excuse is not held to be as valid. However, where a large demand is made by a new customer which will be greater than the possible supply of natural gas or of water from the nearest

1915F, 95; *Vanderbilt v. Hackensack Water Co.* (N.J. Ct. Errors & App.), P.U.R. 1933E, 343; *Schnell v. Passaic Consol. Water Co.* (N.J.), P.U.R. 1926A, 150; *Title Guarantee & Trust Co. v. 457 Schenectady Ave.* (N.Y. C.A.), P.U.R. 1933D, 169; *Devon Park Hotel Corp. v. Hunter* (Pa.), P.U.R. 1928B, 624; *Willow River P. Co. v. Railroad Comm.*, P.U.R. 1928E, 108; *Howe v. Orange* (1907), 73 N.J. Eq. 410, 62 Atl. 1101; *Kohler v. Reitz* (1911), 46 Pa. Super. 350; *New Orleans Gas L. & Banking Co. v. Paulding*, 12 Rob. (La.) 378; *Turner v. Revere Water Co.*, 171 Mass. 329; *Sanborn v. Springfield Water Co.* (Pa.), P.U.R. 1921A, 708; *Morrison v. Lee* (Colo.), P.U.R. 1932C, 139.

¹ *Ebenezer Tel. Co. v. Milwaukee L. H. & Traction Co.* (Wis.), P.U.R. 1915A, 174.

² *Re Augusta Water Dist.* (Me.), P.U.R. 1916E, 231; *State v. Mobile, J. & K.C.R. Co.*, 86 Miss. 172, 38 So. 732; affirmed 210 U.S. 187.

³ *Re International R. Co.* (N.Y.), P.U.R. 1923B, 811; *Johnson v. H. L. Nay Tel. Line* (Cal.), P.U.R. 1921C, 337; *McClintic-Marshall Construction Co. v. Philadelphia Suburban Gas & E. Co.* (Pa.), P.U.R. 1922D, 758.

available source, other consideration must be given. In this latter instance, the cost of developing a new source must be charged against the new customer, rather than against all the customers, where such development would require a general increase in rates.¹ The excuse for nonperformance by a subsidiary of a large holding company is covered in the following citation:

A paramount factor in the Los Angeles telephone situation is the relation that exists between the Southern California Tel. Co. and its parent and affiliated companies. It appears from evidence submitted that the stock of the Southern Cal. Tel. Co. is owned and controlled by the Pacific T. & T. Co., which, in turn, is owned and controlled by the American T. & T. Co. of New York; also that the Western Electric Co. from which the materials and equipment of the local company are purchased, is owned and controlled by the American T. & T. Co. While these relations may be entirely legitimate, we must assume, if we are to avoid a legal subterfuge, that the local company is for all intents and purposes the American T. & T. Co. and that the local company has, therefore, at its command the financial resources of the American T. & T. Co. and the material products of the Western Electric Co. Any attempt on the part of the American T. & T. Co. to evade the responsibilities of its ownership of the local company, and, therefore, of its obligation adequately to meet the full service demand of Los Angeles, should be vigorously resisted by the Railroad Commission.—*Re Southern Cal. Tel. Co. (Cal.)*, P.U.R. 1924C, 506.

In general, the excuse of lack of right of way for service is not accepted as valid, for any public utility, having a franchise to operate and a charter from the state, has the right of eminent domain to have a strip of land condemned for such purpose in case an easement cannot be obtained or the property cannot be purchased.²

¹ Commonwealth ex rel. State Corp. Comm. v. Washington & Old Dominion R. Co. (Va.), P.U.R. 1921A, 449; *Amenia Tel. Co. (N.D.)*, P.U.R. 1929D, 614; *Re Augusta Water Dist. (Me.)*, *supra*; *Gastonguay v. Hannibal R. Co. (Mo.)*, P.U.R. 1916A, 1013; *Public Util. Comm. v. St. Clair County Gas & E. Co. (Ill.)*, P.U.R. 1921B, 47; *Re Mountain Water Co. (Cal.)*, P.U.R. 1920E, 606; *State ex rel. R. Comm. v. Bullock*, 78 Fla. 321, 82 So. 866, 8 A.L.R. 232, P.U.R. 1920A, 406; *Re Chippewa County Tel. Co. (Wis.)*, P.U.R. 1929D, 340.

² *Commercial Club v. Chicago, M. & St. P. R. Co. (S.D.)*, P.U.R. 1917D, 983; *Bastian v. American Natural Gas Co. (Pa.)*, P.U.R. 1923E, 142; *Boyce v. Pacific Gas & E. Co. (Cal.)*, P.U.R. 1919F, 532.

In the case of natural gas, a shortage of supply with no other source in view may require a curtailment of supply to some customers. It is usually the custom, first to cut off supply to industrial users and then the use of gas for all except strictly domestic cooking, heating, or lighting use.¹ This is commonly done by regressive rates which require higher rates for increased use of gas or of priorities in the class of service. In the case of a water supply, it is necessary to develop new sources of supply, by taking in the next available source.² In some instances, this procedure may involve a considerable increase in capital cost per unit of new demand over the first development. Where this extra cost is necessary from the gradual and natural growth of the demand, the extra investment cost requires a general revision of the rate structure. In the event of a new demand by some large customer, where the original source of supply would be adequate for the regular customers for a considerable period in the future, the excess of the investment must be charged to the new customer rather than to the property as a whole. In the case of electric and telephone service, it is usually possible to amplify the present output to meet future demands by the addition of new and relatively small units of station facilities. In the case of a hydroelectric development with no steam or other stand-by capacity, the extra load may have to be met by the addition of new units of steam or other forms of generating equipment.³ These units may cost more per unit of output and per unit of operating cost than the original station. Such additional equipment must be properly allocated between old and new customers.⁴ This is discussed for a large hydroelectric development in the following:

The available methods of conserving the available hydro-plant capacities are the following: (1) Pending the development of a winter peak

¹ *Re Peoples Gas Co. (Ind.)*, P.U.R. 1922E, 784; *Austin Borough Council v. Potter Gas Co. (Pa.)*, P.U.R. 1920C, 830; *Re Midway Gas Co. (Cal.)*, P.U.R. 1920C, 624; *Conewango Refining Co. v. Pennsylvania Gas Co. (Pa.)*, P.U.R. 1921D, 141.

² *Palmer v. Southern Cal. Mountain Water Co.*, 2 Cal. R.C.R. 43; *Morris v. Wood (Cal.)*, P.U.R. 1927C, 316.

³ *Vanderwood v. Mackey L. & P. Co. (Idaho)*, P.U.R. 1926E, 221.

⁴ *Tuckerton v. Tuckerton Gas Co. (N.J.)*, P.U.R. 1919C, 998; *Allen v. Park Place Water L. & P. Co. (Tex. Civ. App.)*, 266 S.W. 219, P.U.R. 1925C, 520; *Re New York City R. Co.* 1 P.S.C. N.Y. (1st Dist.), 66.

requiring plant in excess of the summer needs; (a) Restriction of further development of irrigation pumping except at regular power rates. (b) Rotation of use, when necessary, by irrigation power users, within limits of practicability as later developed. (2) The immediate release of unnecessarily duplicated plant capacity where both cooking and water heating service have been supplied, by requiring that such service be alternated. Only by using plant capacity, installed and primarily used for higher class service, can water heating service for ordinary purposes be justified. (3) Metering all water heating and air heating service will restrict such use to the necessities of such service. Conservation of heat by a heat insulating covering for the hot-water tank should reduce the necessary cost of such service to within reasonable limits for both the water heating customer and for the utility. In other words, service for water heating will not further continue as an uneconomical burden for the other users of electric service to carry. (4) The requirement that power rates be so formulated that an increase of load factor will result in a decrease in the monthly bill for the same amount of energy. Application of the above corrective provisions in the rates herein prescribed should allow the existing major plant facilities to continue to render adequate service until the normal increase in the use of electric energy at reasonable rates will, of itself, justify the additional investments in plant capacity.—*Re Idaho P. Co. (Ore.)*, P.U.R. 1924E, 399.

Strikes and unforeseen accidents may excuse a utility from rendering service until these conditions have been overcome.

The fact that striking employees actually interfere with service may be a proper excuse for failure to serve, although the mere existence of a strike, especially when avoidable, is not sufficient cause for service interruptions.—*Public Service Comm. v. International R. Co.*, 224 N.Y. 631, P.U.R. 1919B, 210.

In the case of floods, it is usually impossible for any of the utilities to render service in the flooded sections of the territory. However, such failure should be overcome as soon as possible and full service restored.¹

Rules, Regulations, and Contracts.—Any public utility has the necessity, as well as the right, to publish rules and regulations to govern those who take its service. These rules and regulations must be reasonable and consistent with the laws and ordinances

¹ *Hotel Statler v. New England Tel. Co. (Mass.)*, P.U.R. 1927B, 579; *Re International R. Co. (N.Y.)*, P.U.R. 1923B, 811; *Public Service Comm. v. Nevada Northern R. Co. (Nev.)*, P.U.R. 1919F, 334; *Summit Hill v. East Penn E. Co. (Pa.)*, P.U.R. 1928E, 288.

of the state and municipality in which the utility is operating. They must also apply to the particular kind of service rendered. Where there is a public utility commission, these rules are usually approved by such a body. In some states uniform rules have been issued by the commission, applying to all utilities in the same class and of the same kind. Such rules are for the protection of the customers and for a better understanding. They assure a more uniform treatment of all customers receiving the service.¹

Two citations will be given covering the opinion of the state supreme courts as follows:

"It is a well settled rule of law that every utility has the right to make and enforce reasonable rules and regulations with which its patrons may be compelled to conform and this applies equally to municipalities operating utility plants." *Cooper v. Googland*, 80 Kan. 121, 102 Pac. 244. "A municipal ordinance which prescribes regulations of the city's water works has no greater force than the by-law of a private corporation enfranchised to do business of a like character, since both stand on the same footing and have exactly the same right to make and enforce reasonable regulations and rules." *Etheridge v. Norfolk*, 148 Va. 795, P.U.R. 1928A, 409.

It is customary to require a new customer for service, or one seeking a new type of service, to sign a contract covering the type of service and to agree to the rate structure to be applied to the service to be rendered. In some cases it is also required that a new customer shall provide a deposit to cover at least one

¹ *West Hartford v. Board Water Comm'rs*, 68 Conn. 323; *Westminster v. Consolidated Pub. Util. Co.* (Md.), P.U.R. 1919F, 506; *Glenn v. Mohawk Edison Co.* (N.Y. 2d D.), P.U.R. 1920C, 184; *Wautauga v. Wolfe*, 99 Tenn. 429, 41 S.W. 1060; *Re Napa Valley E. Co.* (Cal.), P.U.R. 1925A, 724; *City of Hamilton v. Missoula Pub. Service Co.* (Mont.), P.U.R. 1927 A, 642; *Borough of Clearfield v. Clearfield Water Co.* (Pa.), P.U.R. 1928B, 631; *Parker v. St. Joseph Water Co.* (Mo.), P.U.R. 1928E, 161; *67 S. Munn. Inc. v. Public Service E. & Gas Co.* (N.J.), P.U.R. 1929A, 329; *Weigand v. Alabama P. Co.* (Ala.), P.U.R. 1930B, 126; *Re Sullivan Tel. Co.* (Ind.), P.U.R. 1930E, 282; *Re Spooner* (Wis.), P.U.R. 1917C, 78; *Re Manitowoc Municipal E. Dept.* (Wis.), P.U.R. 1925C, 33; *Re Public Service E. & Gas Co.* (N.J.), P.U.R. 1927C, 321; *Anistel v. Macatawa Resort Co.* (Mich.), P.U.R. 1928E, 606; *Re Brooklyn Edison Co.* (N.Y.), P.U.R. 1931E, 193; *Re Plainfield-Union Water Co.* (N.J.), P.U.R. 1929B, 93; *Collins v. Union E. L. & P. Co.* (Mo.), P.U.R. 1930D, 446; *Fox-Crest v. Public Service E. & Gas Co.* (N.J.), P.U.R. 1930E, 36; *Re New York Edison Co.* (N.Y. 1934), 4 P.U.R. (N.S.) 337.

month's bill under such a contract. Such contracts are not unreasonable, although they are wholly unnecessary, except where the laws under which the company operates do not cover all the conditions implied by such a contract.¹ There are limits to the exactions of such rules and guaranties: "A city operating a waterworks cannot require an applicant to release it from liability as a condition of service." *Dittmer v. New Braunfels*, 20 Tex. Civ. App. 293, 48 S.W. 1114.

Payments in advance and "meter deposits" are sometimes required before rendition of service, especially in the case of new customers who have not established their credit, or where in the past a customer has been delinquent in payment of bills. The purpose of such advance payment or meter deposit is to protect the utility against loss from failure to secure payment for service rendered from the date an account comes due until the service is discontinued. Where payment for service is made in advance, as in the case of street-railway fares, local telephone service, and prepaid freight service, no deposit or guarantee is necessary.²

That a public utility has a right to require a deposit from customers who are not able to establish financial responsibility when applying for service is a principle well established and of long standing. The District of Columbia Supreme Court, in ruling on this question, stated:

¹ *Williams v. Mutual Gas Co.*, 52 Mich. 499; *Green v. Byers*, 16 Idaho 178; *Bourke v. Olcott Water Co.*, 84 Vt. 121, 78 Atl. 715; *Farmer v. Nashville*, 127 Tenn. 509, 156 S.W. 189; *Public Service Comm. v. Nevada-California P. Co.* (Nev.), P.U.R. 1915F, 592; *Merryman v. Baltimore City* (Md. App.), P.U.R. 1928B, 546; *Re West Coast P. Co.* (Wash. 1934), 5 P.U.R. (n.s.) 204; *East Bakersfield Improvement Ass'n v. San Joaquin L. & P. Corp.* (Cal.), P.U.R. 1916C, 830; *City of Lee's Summit v. Independence Waterworks Co.* (Mo.), P.U.R. 1928B, 13; *Re Washtucka L. & P. Co.* (Wash.), P.U.R. 1932B, 31; *Vandenberg v. Kansas City, Mo., Gas Co.*, 126 Mo. App. 600, 105 S.W. 17.

² *Ellman v. Illinois Central R. Co.*, 9 Wis. R.C.R. 240; *Ward & Co. v. Chicago & N.W.R. Co.* (Ill.), P.U.R. 1915A, 1003; *Re Consumers Co.* (Idaho), P.U.R. 1923A, 418; *Manhattan Reporting Bureau v. New York Tel. Co.* (N.Y.), P.U.R. 1926B, 1; *Re Indianapolis Water Co.* (Ind.), P.U.R. 1929B, 355; *Re Connersville* (Ind.), P.U.R. 1922C, 482; *Devon Park Hotel Corp. v. Hunter* (Pa.), P.U.R. 1928B, 624; *Columbus v. American Gas Co.*, 96 Kan. 367, P.U.R. 1915F, 889; *Re Western United Gas Co.* (Ill.), P.U.R. 1916C, 808; *Re Plainfield-Union Water Co.* (N.J.), P.U.R. 1929A, 610; *Levers v. Public Util. Consol. Corp.* (Colo.), P.U.R. 1932C, 137.

The only purpose of the rule is to assure payment by the customer or subscriber for the service which he gets. This the utility, like any other business organization, has a right to demand in advance if it wishes. *Southwestern T. & T. Co. v. Danaher*, 238 U.S. 482, 59 L. Ed. 1419, P.U.R. 1915D, 571, 35 S. Ct. 886; *Vaught v. Eastern Tennessee Tel. Co.* (1910) 123 Tenn. 318, 130 S.W. 1050, or, if it should not, to impose reasonable conditions as a basis of credit. Since there is no claim that the rule is not impartially enforced, or that its terms are oppressive or unreasonable, we think it is not discriminatory.—*Riegl v. Public Util. Comm.* (D.C.), 48 F. (2d) 1023, P.U.R. 1931D, 7.

Mutual and co-operative organizations entering the public-utility field are composed of stockholders who are served by such a utility. However, such a utility becomes a monopoly in the field and excludes any other from rendering service. As a consequence, it is usually held that purchase of stock in such a company may not be required of all customers before the rendition of service.¹

The principle of allowing the owner of an apartment or office building to purchase the entire requirements of the building from the utility through a single meter and then to remeter the service and to charge his tenants for the amount of service as shown by each individual meter has not been decided uniformly in all states or in different sections of the same state. A question arises as to whether such an owner or operator does not himself become a public utility under the jurisdiction of the commission or of the municipality where he submeters and establishes the rates and rules for such service.

The utility receives its payment for such service at the rate obtaining for retail service, which rate is usually a block rate or a two-part rate of the demand and energy type, and such payment will be different from what it would be if all tenants were supplied individually by the utility. The lesser amount received by the utility may be partly offset by a saving in expense caused by a lower investment in meters, the elimination of expense of reading these meters and billing and collecting charges. However, a number of problems, such as discrimination between these

¹ *Re Sylvan E. Co. (Wis.)* P.U.R. 1926A, 177; *Re Prentice Mutual Tel. Co. (Wis.)*, P.U.R. 1928A, 614; *Re Letcher Tel. Co. (S.D.)*, P.U.R. 1916E, 486; *Wachal v. Eau Claire Valley Tel. Co. (Wis.)*, P.U.R. 1921A, 357; *Re Lake Hemet Water Co. (Cal.)*, P.U.R. 1917A, 458.

customers and other individual customers of the same class, responsibility of the landlord as a public utility, and benefits to tenants, arise; and opinion is not entirely uniform in these matters. Generally speaking, however, the opinions seem to be not at all favorable to such resale of energy by landlords, because of the likelihood of inadequate servicing of customers' installations and taking care of complaints, in other words, "trouble shooting," and the adverse effect on other customers because of the lesser income derived by the utility from such reselling practice.¹

¹ *Ladoga v. Ladoga Masonic Building Co. (Ind.)*, P.U.R. 1928C, 302; *67 South Munn St. v. Public Service E. & Gas Co. (N.J.)*, P.U.R. 1929A, 329; *Lewis v. Potomac E. Power Co. (D.C.)* 64 F. (2d) 701, P.U.R. 1930B, 147; *Kerrick v. Potomac E. Power Co. (D.C.)*, P.U.R. 1932C, 40.

CHAPTER XXV

EXTENSIONS OF SERVICE

Duty to Extend Service.—The privilege enjoyed by a public utility in any particular area carries with it the obligation to serve any and all applicants according to the rules, regulations, and rates of the utility, as approved by the governmental body having jurisdiction. When these applicants, or prospective customers, are located along an existing line or main from which they may be served with minimum cost for new connections and meters, it is the duty of the company to connect them and to render service to the limit of the capacity to serve. However, when a new customer is situated a considerable distance from the service lines or pipes of the utility, the income from the business secured by the extension may not be sufficient to pay fixed charges on the investment in the extension and the other elements of cost, some of which are common to all customers.

Where no other prospective customers are situated along the new extension, the utility may refuse to serve the new customer unless he pays for the installation of the service beyond the usual free extension distance allowed. In case of an advance from the customer (usually designated as "contribution to extension"), a refund may be made for each new customer taking service in the future from the same extension. The company must have certain rules for the extension of its service in order to protect its other customers against unfair discrimination. In the case of water extensions, it is usually required that sewers must also be extended, although this rule is by no means universal. Sometimes water connections beyond the limit of present fair income are required by a city as a sanitary measure. This is under police rules for health purposes. No such rule attaches to electric or gas connections. In the case of rural extensions, rules for uniform action by all utilities in the same state are desirable, and frequently state commissions formulate such rules. Such customers usually demand the same rates for the several

classes of service as are enjoyed by customers in the large city. If this practice is to be followed, what is the maximum amount that can be invested in extensions and still permit the utility to earn a fair return?

If D represents the cost of all extensions made to date (which constitutes the existing distribution system in most cases), E the cost of all other equipment, F the annual fixed charge in per cent, R the annual revenue of the utility, Q the quotient obtained by dividing the entire operating expense by the entire annual gross revenue (operating ratio), we have

$$R(1 - Q) = \frac{F(D + E)}{100}.$$

Suppose an extension costing an amount represented by d is contemplated and the anticipated annual revenue to be obtained from customers to be served from the extension is represented by r . With the operating ratio remaining the same,

$$(R + r)(1 - Q) = \frac{F(D + d + E)}{100}.$$

Solving for d , we obtain

$$d = \frac{100r(1 - Q)}{F}.$$

This ignores the amount by which it is necessary to increase E . When this is taken into consideration, there results the following

$$(R + r)(1 - Q) = \frac{F(D + d + E + e)}{100},$$

from which

$$d = 100 \left[\frac{r(1 - Q)}{F} \right] - e.$$

In other words, the amount that a utility can afford to spend for an extension is equal to the capitalized value of the annual net earnings to be derived from the extension, less the cost of increase in all other facilities caused by additional load from the extension. The investment in distribution D is carried in a separate account so the increase in this account is recorded from month to month. Likewise the investment in all other property E is

known; hence the ratio of the increase in distribution (d) to the increase in other facilities (e) can be calculated. Representing this ratio by S , we have

$$d = \frac{100r(1 - Q)}{F\left(1 + \frac{1}{S}\right)}$$

This shows that, with a given operating ratio, the larger the ratio S becomes, the closer d approaches the amount $r(1 - Q)/F'$ and with F equal to $12\frac{1}{2}$ per cent, Q equal to 50 per cent, it

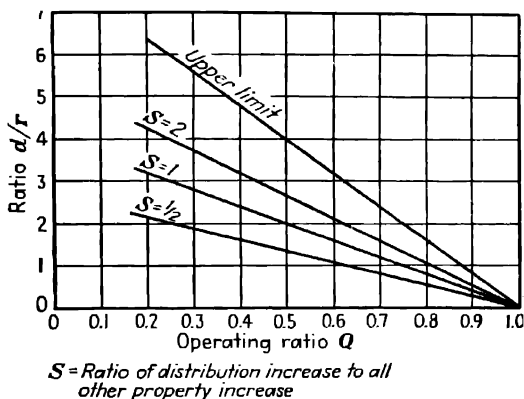


FIG. 18.

approaches $4r$. That is, for each \$1 of anticipated annual revenue to be derived from an extension, a utility can afford to spend up to \$4 in constructing it. Of course this amount would be different with a different operating ratio, being only half as much with an operating ratio of 75 per cent. The usual practice is to spend somewhere between two and four times the estimated annual revenue.

This relationship, expressed by the equation, is shown plotted in Fig. 18. From this figure, it is at once apparent that the amount a utility can afford to put into extensions decreases with an increase in operating expense. It is possible to be liberal in building extensions only when the ratio of such extensions to all other property is large and the operating ratio is small. The

latter of these two can be made smaller than the average by charging higher rates to customers served by such extensions than are charged in urban centers.

The preceding discussion has to do primarily with extensions to serve residential customers in the outlying districts surrounding urban communities. The rule covering extensions in these cases should be such that no additional burden will be imposed on the urban customers. If the underlying premise is that the utility is to earn a reasonable return on all its investment, both that used in urban and suburban districts, a loss incurred in the suburban must be made up by a larger return on the urban, and the urban customers may object. Usually, however, the ratio of investment used in suburban service to that used in urban is small; thus the costs of serving urban business are not greatly affected by small losses on suburban service. Since an incorporated community is able to install a municipal plant and is not obliged to extend its service facilities to customers located beyond its boundaries, there is a limit to the loss that a privately owned utility may incur in suburban and rural business and expect to offset by extra gains in urban business. This situation must not be ignored in formulating extension rules and policies.

Extension of three-phase alternating-current and direct-current service does not come within the category of the discussion above. The first electric plants were direct current and in a number of cities in business districts, it is still being supplied to a limited extent. Because of limiting direct-current supply, many problems have arisen such as the following:

1. Is the utility obliged to extend the direct-current service to new customers outside the direct-current area or to new customers inside the area where alternating-current service is available? Is it obliged to provide additional direct-current service where an existing customer requires more power and prefers direct to alternating current?

2. Has the utility the right to remove its direct-current facilities immediately after a building is vacated and then to offer alternating current only to the new occupant?

3. Shall the utility be compelled to pay all or a portion of the expense incurred by a customer in replacing his direct-current motors with alternating-current motors when he moves from

inside the direct-current district to a district where alternating-current only is available?

These problems can be minimized as follows: (1) by charging more for direct than for alternating-current service; (2) by adhering rigidly to the principle of not extending either the direct-current district or supplying direct current to new customers in the area; (3) by removing direct-current supply from buildings temporarily vacant; and (4) by payment of all or a part of the cost incurred by a customer in changing his motors.¹

Before any underground construction is undertaken by a utility in the streets of a city, the lines and grades of the streets must be obtained from the city engineer. Without this necessary information it is impossible to know in advance whether the underground work will later be too deep in the ground or whether the pipes may later be too near the surface for safety from mechanical injury or from freezing. When new paving is to be laid in a street, it is also desirable to have all underground construction done in advance of this paving in order to prevent later damage from cutting of the paving to make extensions or for service connections to the mains. In some cities, rules forbid cutting the paving for a period of time after new paving is laid. However, it is usually beyond the power of some municipalities to compel a utility to make extensions or changes that involve capital charges which would otherwise be unnecessary for a considerable number of years. The utility is usually willing to make

¹ *Dobbs v. Pacific Gas & E. Co.*, 1 Ariz. C. C. 347; *Lukrawka v. Spring Valley Water Co.*, 169 Cal. 318, P.U.R. 1915B, 331; *Zeilda Forsee Investment Co. v. St. Joseph Gas Co.*, 196 Mo. 371, 195 S.W. 52; *Oklahoma Gas & E. Co. v. State*, 87 Okla. 174, P.U.R. 1923A, 401; *Roberge v. Berlin Water Co. (N.H.)*, P.U.R. 1924C, 855; *Re Middlesex Water Co. (N.J.)*, P.U.R. 1925A, 116; *Id.*, 6 N.J. Miss. R. 51, P.U.R. 1928C, 343; *Re Johnstown Water Co. Pa.*, P.U.R. 1933C, 163; *Nessler v. Peoples Natural Gas Co. (Pa.)*, P.U.R. 1923E, 147; *Haines v. Colorado Springs L. H. & P. Co. (Colo.)*, P.U.R. 1928C, 47; *Re Penn Central L. & P. Co. (Pa.)*, P.U.R. 1933E, 97; *O. K. Manufacturing & Stamping Co. v. Consolidated Gas & E. Co.*, 4 Md. P.S.C.R. 158; *Jackman v. Janesville E. Co. (Wis.)*, P.U.R. 1916C, 400; *Re Public Service Co. of Northern Ill. (Ill.)*, P.U.R. 1917F, 797; *Eari Carrol Realty Co. v. New York Edison Co. (N.Y.)*, P.U.R. 1931E, 297; *Re Brooklyn Edison Co. (N.Y.)*, P.U.R. 1932A, 337; *Illinois Commerce Comm. v. Chicago Motor Coach Co. (Ill.)*, P.U.R. 1929A, 96; *Re Wyoming Valley Water Supply Co. (Pa.)*, P.U.R. 1931D, 19; *Aurora v. Lawrence County Water L. & Cold Storage Co. (Mo.)*, P.U.R. 1931B, 478.

such investments if there is a probability that the new investment will be able to earn a fair return within a reasonable time.¹

Depending on Prospective Return.—In considering the duty to make extensions into new territory, the ratio between the cost of the extensions and the prospective revenue from such an investment is a material factor. For this reason, a certain number of customers per mile of main or of line are required in residential areas, and provision is made to provide only a certain length of extension free of charge, the new customer paying for any excess length. Probability of rapid growth of population in a new area may cause the utility to make extensions into this area in advance of customers; such extensions assisting in accelerating the growth of the division as well as in building up a new load in the district. Such extensions are sometimes made by street railways or bus lines running into suburban areas of a city. The passengers from these areas help to bring in revenue from the regular schedules of the original installation by lowering the cost of overhead expenses for the whole system per revenue passenger carried. However, the utility must guard against lending assistance to schemes for the exploitation of new residence divisions to the profit of private investors developing these subdivisions.²

"In this order by 'average farm use' is meant the use of electrical energy continuously throughout each year on an average farm having the usual complement of farm house, barns, and other buildings with an average income return from the farm operation. Non-farm use such as gas stations, churches, schools, summer resorts, summer cottages, and

¹ *Township Committee v. General Water Supply Co.* (N.J.), P.U.R. 1925A, 388; *F. Culp v. Roaring Creek Water Co.* (Pa.), P.U.R. 1927E, 420; *Waukesha Gas & E. Co.* (Wis.), P.U.R. 1923A, 686.

² *Winthrop & W. L. & P. Co.* (Me.), P.U.R. 1916F, 752; *Re Milwaukee R. & L. Co.* (Wis.), P.U.R. 1920A, 361; *Tuscarora v. Moss Glen Water Co.* (Pa.), P.U.R. 1922E, 609; *People ex rel. Woodhaven Gas Co. v. Public Service Comm.*, 269 U.S. 244, 46 Sup. Ct. 83, P.U.R. 1925E, 827; *Greenwood v. Provine*, 143 Miss. 42, 108 So. 284, P.U.R. 1927A, 275; *Re Rules and Practices of Village of Rio* (Wis.), P.U.R. 1928C, 404; *Conway v. New Hampshire Water Co.*, 3 P.S.C. N.H. 206; *Paul v. Lewiston-Reedsville Water Co.* (Pa.), P.U.R. 1924E, 357; *Re Latrobe Water Co.*, 115 Pa. Super. 66, 174 Atl. 615 (1935), 6 P.U.R. (N.S.), 364; *People ex rel. New York & Queens Gas Co. v. McCall*, 245 U.S. 345, 38 Sup. Ct. 122, P.U.R. 1918A, 792; *Leavitt v. Public Util. Comm.*, 114 Conn. 618, 159 Atl. 875, P.U.R. 1932C, 337.

similar usage must be considered separately. However, such non-farm use must be included in the number of customers per mile after giving consideration to the length of time and amount of use of each customer under individual circumstances of each case." *Re Consumers P. Co.* (Mich. 1936), 11 P.U.R. (N.S.) 362. "Our conclusion is that up to the point where a cooperative association is formed, and a loan contract signed, there should be an open opportunity to solicit customers and bring them the information necessary to a choice of how and when electric service can be obtained. However, when a duly organized cooperative association has laid out a project, and has signed a contract, it appears uneconomic to authorize additional construction by any other agency, without good cause shown, at least until the costs and conditions of service by the cooperative are definitely known. On the other hand, where plans for a cooperative have not reached this stage and where existing utility has projected an extension to reach bona fide applicants for service, denial of the privilege of construction by the utility, except for compelling reasons duly shown, appears unwarranted." *Re Extensions of Rural Lines of Electric Util.* (Wis. 1936), 15 P.U.R. (N.S.) 364.

Guarantee of Revenue.—Those applying for an extension into new territory are sometimes willing to make a contract guaranteeing the proper revenue from the extension, and the applicants stand willing to reimburse the utility for any lack of income from this source. This may be done by a contract or by a guaranty by a surety company. The latter plan is seldom necessary when dealing with owners of the real estate being served or with customers who have established their credit in the community.¹

Customer Contributions.—In the case of extensions into rural areas and suburban districts beyond the lines of a utility and into newly developed areas of a city, the company will extend its facilities free of charge only for a certain maximum distance; all lines beyond this distance being paid for by contributions from customers who are to receive the service. Arrangement is made in the contract to refund to these customers certain definite amounts when other customers take service from these extensions within a reasonable period of time after they are first con-

¹ *Hennessy v. Village of Highland* (Wis.), P.U.R. 1926E, 821; *Re Hampden & Newberg L. & P. Co.* (Me.), P.U.R. 1932E, 417; *Boundary Realty Co. v. Hackensack Water Co.* (N.J.), P.U.R. 1920F, 1005; *Re Boise Water Co.* (Idaho), P.U.R. 1928B, 578; *Re Otter Tail P. Co.* (N.D.), P.U.R. 1931D, 384.

structed. However, it is not permissible to make the extension for payment in any form except in money. Extensions paid for in commodity of any kind permits the utility to acquire its property and, therefore, to increase its capital out of earnings.¹

Where contributions are made by customers for an extension longer than the amount allowed free, such contribution may be considered as an advance additional payment, as discussed elsewhere. Assuming that an extension costs \$1,000, the free allowance is only \$600, based on three times the estimated annual revenue of \$200, the customers would be asked to pay \$400 or else guarantee an annual revenue of \$333. The utility is entitled to depreciation, maintenance, and operation (including taxes) on the extra \$400 so that in addition to the cash contribution the customers should pay these three items. Assuming the \$400 is an advance payment and the annual expense including interest is \$50, the utility would be getting \$40 per year for about 11 years, with 6 per cent interest; with 5 per cent interest it would be slightly less.

Municipal-plant Extensions.—Three questions arise in considering extensions by municipally owned plants outside the city limits. The first of these questions concerns the legality of such an enterprise. In some states special laws have been enacted not only permitting joining of suburban areas to the distribution system of a municipally owned plant but also permitting such a system to construct transmission lines for electric service to distant cities or to rural areas. In other states the outside rural area has constructed its own transmission line to the city limit of the municipality supplying the service, the maintenance and ownership of such a line not being taken over by the municipal plant. The second question arises in connection with supply of power to co-operatively owned rural lines,

¹ *Pacific Gas & E. Co. v. Great Western P. Co.*, 1 Cal. R.C.R. 203; *Re Yarmouth L. Co. (Me.)*, P.U.R. 1920A, 506; *Re Badger Pub. Service Co. (Wis.)*, P.U.R. 1924D, 531; *Re General Order No. 28 (Pa.)*, P.U.R. 1927C, 142; *Re Fontana Domestic Water Co. (Cal.)*, P.U.R. 1928C, 661; *Re Indianapolis P. & L. Co. (Ind.)*, P.U.R. 1929C, 471; *Meyer v. Southwestern Gas & E. Co.*, 133 So. 504, P.U.R. 1931D, 484; *Re Davis Mill & E. Co. (Wis.)*, P.U.R. 1932A, 478; *Re Missouri Pub. Service Co. (Mo. 1934)*, 3 P.U.R. (N.S.) 163; *Re Tri-County P. Corp. (Ind.)*, P.U.R. 1931E, 351; *Leavitt v. Public Util. Comm.*, 114 Conn. 618, 159 Atl. 878, P.U.R. 1932C, 337; *Re Middlesex Water Co. (N.J.)*, P.U.R. 1933E, 326.

constructed from funds and under the supervision of the Federal Rural Electrification Administration. In such cases, the lines are built to the city limits or to a common substation, at which point the energy is metered and the lines are connected by suitable switching and metering equipment.¹

A third question to be considered is: What rates shall be charged for service outside the city limits? This has been considered and answered more in detail in a chapter on rates. Usually a higher rate is charged for such service because those receiving the service do not pay taxes within the city owning the lines. The same questions as to length of free extensions and customer participation in the cost of the extension also apply as in the case of privately owned systems.

¹ *Western Reserve Steel Co. v. Village of Cuyahoga Heights (Ohio)*, P.U.R. 1928D, 829; *Diedrich v. Kaukauna (Wis.)*, P.U.R. 1929C, 612; *Dunlap v. Clarendon Hills Water Co. (Ill.)*, P.U.R. 1928B, 582; *New York Central E. Corp. v. Village of Castile (N.Y.)*, P.U.R. 1929B, 478; *Re Phoenix (Ariz.)*, P.U.R. 1929D, 497.

CHAPTER XXVI

ABANDONMENT OF SERVICE

Duty to Continue Service.—Unlike other forms of business not having to do with public service and in which there is no monopoly vested in the company by reason of a franchise, charter, or other form of public permission, a public utility cannot abandon its business and refuse to serve without the consent of some legally constituted agency, such as a commission, a court, or a legislature. By virtue of the fact that the utility is allowed to monopolize the field and that others are prevented or restricted from entering in a competitive way, the customers of the utility are dependent for their service upon the continuance of the operation of the utility. In some cases the very life of the community is bound up in this continuance in operation. This is especially true of the water-supply and sanitary-disposal systems in large cities, where original wells have been abandoned by the householders as a sanitary measure by order of the police authority of the city. For such individuals to secure another supply is impossible. The effect of a stoppage of the water supply or its contamination is sometimes accidental during floods or other natural disasters.

The operation of the transportation systems, both vertical in tall buildings and horizontal along the city streets, depends upon an adequate supply of electricity. No modern city could exist long without electrical supply for illumination, power, and other uses linked with modern life. Gas for heating, cooking, and industrial uses, the telephone for its various instantaneous communication connections with all parts of the world, the telegraph, steam railroads, and other utilities are also tied to modern national and international life.¹

¹ *American Lumber Co. v. Tombigbee Valley R. Co.*, 154 Ala. 385, 45 So. 911; *Weeks Steamboat Co. v. Peoples Steamboat Co.*, 214 U.S. 345; *Pacific Spruce Co. v. McCoy*, 294 Fed. 711, P.U.R. 1924C, 794; *Gates v. Boston & New York Air Line R. Co.*, 53 Conn. 333; *Western & A. R. Co. v. Georgia Pub. Service Comm.*, 267 U.S. 493, P.U.R. 1925D, 100; *Helena v. Helena L. & R. Co.*, 63 Mont. 108, P.U.R. 1922E, 588; *State ex rel. Grins-*

"If the franchise under which the utility is operating is merely permissive in nature the utility may withdraw from the service." Where the franchise is obligatory, the service cannot be withdrawn unless the utility is permitted to do so by the commission or a court having jurisdiction. Surrendering the property and franchise right to another company does not absolve the utility from carrying out the provisions of the franchise. Service cannot be discontinued from customers where there is a contract for service without the consent of the other party, so long as the consumers comply with the contract provisions.¹

In the abandonment of a railroad, consideration has to be given to the rights of communities along the route of the railroad. These communities have been built up at the same time as the railroad, and they depend upon the railroad for outlets for their products and for the bringing of necessities, as well as for passenger travel. Unless other adequate transportation is provided, these communities will retrograde because they have no transportation. In a similar manner, suburban divisions of cities have been built up by the aid of transportation over street railways. With the abandonment of particular lines or routes, the property values in these additions will drop unless some other adequate means of transportation is provided. Property owners have a right to protest against abandonment of utility service of any kind, as a taking away of their property without due process of law, unless an adequate hearing is given by the proper tribunal and they are heard in protest.²

felder v. Spokane S. R. Co., 19 Wash. 518, 53 Pac. 719; Re Bangor Hydro-electric Co. (Me.), P.U.R. 1930D, 336. Re City of Laurel Waterworks (Mont. 1935), 8 P.U.R. (n.s.) 30; Re Butte E. R. Co. (Mont.), P.U.R. 1920E, 760; Ricketts v. Birmingham S. R. Co., 85 Ala. 600, 5 So. 353; Brooks-Scanlon Co. v. Railroad Comm., 144 La. 1086, 81 So. 727, P.U.R. 1919E, 1.

¹ San Antonio S. R. Co. v. Texas ex rel. Elmendorf, 90 Tex. 520, 39 S. W. 926; Ricketts v. Birmingham S. R. Co., *supra.*; Kearner v. West Chester, 199 Pa. 392, 49 Atl. 227; Loughton v. Carthage, 175 Fed. 145; Brooks-Scanlon Co. v. Railroad Comm., *supra.*; Gallagher v. Equitable Gas L. Co., 141 Cal. 699, 75 Pac. 329; Callery v. New Orleans Waterworks Co., 35 La. Ann. 798; Texas R. Comm. v. Eastern Texas R. Co., 264 U.S. 79; P.U.R. 1924C, 407; Re Otter Tail P. Co. (N.D.), P.U.R. 1925E, 407; United Gas Co. v. Railroad Comm. (Ky.), P.U.R. 1919A, 28.

² Chicago B. & Q. R. Co. (Minn.), P.U.R. 1924E, 690; Re Tidewater Southern R. Co. (Cal.), P.U.R. 1932D, 469; Re Helena L. & R. Co. (Mont.), P.U.R. 1922D, 841.

Reasons for Abandonment.—When some competitive form of service is introduced, causing a great falling off in the necessity for maintaining the service of a former utility, permission is sometimes given for abandonment of the older form of service. The interurban railway was for a time a strong competitor of the steam railroad, particularly in the short-haul traffic between near-by communities. Such railways built up a large business in passenger, freight, and express service, some of which never had been handled by the older steam railroads. In turn, these interurban railways have met strong competition from buses, motor trucks, and private automobiles, so that many of these interurban railways have been abandoned all over the country with a great loss to their investors. Other causes for abandonment of all or portions of the system of a utility are sometimes met with where the service is no longer necessary.¹

When a utility is being operated at a loss to the company and greater income cannot be obtained, nor can any new methods of building trade or traffic be devised, the utility cannot be compelled to continue operation at a loss. Abandonment of such service will be ordered by a commission or a court under these circumstances after the utility has presented adequate reasons for abandonment.² This is well covered in the following: "A public utility which is compelled to operate at a loss is unconstitution-

¹ *Moore v. Lewisburg & R. E. Co.*, 80 W. Va. 653, 93 S.E. 762; *South Carolina ex rel. Cunningham v. Jack*, 145 Fed. 281; affirming 113 Fed. 833; *Re Southern New York P. & R. Corp.* (N.Y.), P.U.R. 1919F, 700; *Modesto Irrig. Dist. v. Pacific Gas & E. Co.* (Cal.), P.U.R. 1932B, 203; *Re Valley R. Co.* (Pa.), P.U.R. 1933A, 193; *Commonwealth v. Fitchburg R. Co.*, 12 Gray (78 Mass.), 180; *Southwest Missouri R. Co. v. Public Service Comm.*, 281 Mo. 52, P.U.R. 1920D, 351; *People v. Rome, Watertown & Ogdensburg R. Co.*, 103 N.Y. 95, 8 N.E. 369; *Day v. Tacoma R. & P. Co.*, 80 Wash. 161, 141 Pac. 347; *Nashville, C. & S.L.R. Co. v. Hannah*, 160 Tenn. 586, 27 S.W. (2d) 1089, P.U.R. 1930E, 110.

² *Helena v. Helena L. & R. Co.*, 63 Mont. 108, 207 Pac. 337, P.U.R. 1922E, 588; *Re Tidewater Southern R. Co.* (Cal.), P.U.R. 1932D, 469; *Re Denver B. & W. R. Co.* (Colo.), P.U.R. 1919B, 9; *Mt. Carmel Pub. Util. Service v. Public Util. Comm.*, 297 Ill. 403, 130 N.E. 693; *Re Indianapolis S. R. Co.* (Ind.), P.U.R. 1926D, 658; *Re Chicago, H. & G.L.R. Co.* (Ill.), P.U.R. 1927B, 639; *Re Trustees of Town of Thorntown* (Ind.), P.U.R. 1927D, 1; *Commercial Club of Pierre v. Chicago & N.W.R. Co.* (S.D.), P.U.R. 1922D, 32; *Comly v. Meyer Goodstein et al.* (Colo.), P.U.R. 1931E, 31; *Re Denman* (Idaho), P.U.R. 1928C, 672.

ally deprived of property without just compensation which is a part of due process of law." *Texas R. Comm. v. Eastern Texas R. Co.*, 264 U.S. 79.

The question arises in combined utilities whether each branch of the service must make adequate earnings or whether the earnings of the company as a whole are to be considered. If each division must by its own earnings pay its cost of operation, then the utility may abandon any of the units and continue to operate the other units under the franchise. This question has arisen in connection with the proposed abandonment of street railways that are combined with electric power utilities. In nearly every case, the abandonment of the street railway was permitted without discontinuing the other divisions of the utility. In a few cases, by agreement, the combined earnings have been considered in order to continue the service of the railway.¹

The burden of proof is upon the utility to show that it is necessary for it to abandon a service and also that the public will not be damaged too greatly by the abandonment. Before taking such a step, it should exhaust every means possible, such as higher rates, better types of service, lower costs of operation by adoption of new methods of saving, the possibility of a sale of the utility to some other company or to the city, and, in some cases, securing a subsidy from the district or city served. In the case of street railways, it is sometimes possible to substitute trackless trolleys or bus service at a lower cost of operation.²

¹ *Mt. Carmel Pub. Util. Service Co. v. Public Util. Comm.*, *supra.*; *Ft. Smith L. & Traction Co. v. Bourland*, 267 U.S. 330, P.U.R. 1925C, 604; *Western & A. R. Co. v. Georgia R. Comm.*, 267 U.S. 493, P.U.R. 1925D, 100; *United Fuel Gas Co. v. Railroad Comm.*, 278 U.S. 320, 73 L. ed., 400, 49 Sup. Ct. 150, P.U.R. 1929A, 433; *Re Columbia R. G. & E. Co. (S.C.)*, P.U.R. 1927D, 684; *Brooks-Scanlon Co. v. Railroad Comm.*, *supra.*; *Brownell v. Old Colony R. Co.*, 164 Mass. 29, 41 N.E. 107; *Re Helena L. & R. Co. (Mont.)*, P.U.R. 1923C, 780; *Re Central California Traction Co. (Cal.)*, P.U.R. 1928C, 597; *Re Chicago, M. & St. P. R. Co. (Minn.)*, P.U.R. 1919B, 704; *Re Northwestern E. Service Co. (Pa.)*, P.U.R. 1928E, 764; *Re Service Transit Co. (Mont. 1935)*, 6 P.U.R. (N.S.) 127.

² *North Tonawanda v. Niagara L. H. & P. Co. (N.Y. 2d Dist.)*, P.U.R. 1915D, 73; *Merrill v. Southside Irrig. Co.*, 112 Cal. 426; *Re Durango Realty Co. (Colo.)*, P.U.R. 1920B, 505; *Re Boise Valley Traction Co. (Idaho)*, P.U.R. 1920F, 963; *Re Richfield Pub. Service Co. (Idaho)*, P.U.R. 1922A, 100; *Re Barnes-King Development Co. (Mont.)*, P.U.R. 1925E, 200; *Re Hobart Estate Co. (Cal.)*, P.U.R. 1928D, 594.

Problems Involved in Abandonment.—A utility occupying the streets of a city and operating under a franchise from the municipality is under obligation to see that no damage is done to the streets and property of the city in case of abandonment. In the case of street railways, the surface of the streets should be left in as good condition as if the rails had not been laid. This may involve tearing up the rails and laying a street surface as good as that of the remainder of the street or an abandonment of the rails and ties to the city, to be taken up and sold by it at the time the entire street is again paved. In the case of gas or water pipes and of electrical conduits under the surface of the street, an effort should be made to dispose of the entire property to the city or to some company that will take over and operate a similar utility. For this reason, the materials under the surface of the street have little or no salvage value when a utility is abandoned.¹

When a utility is about to discontinue or cut off service, it should notify its customers, if possible, a sufficient time in advance so that they may supply themselves with other service after the abandonment. In like manner, when a customer wishes to have his service disconnected, he should notify the utility in writing and permit the representatives of the utility access to his premises to remove any equipment, such as meters and instruments, owned by the utility. When a utility desires to abandon the complete service for a community, it should file notice of such intention with the community officers and with the commission, so that both sides may present arguments for and against such abandonment. Abandonment should not be permitted until after proper hearings and a decision in favor or a right of appeal by either side to the proper courts. Even temporary stoppage of some types of service should be preceded by a notice by telephone or through the mails to those living in the district served.²

¹ Re *Yonkers Ry. Co.* (N.Y.), P.U.R. 1925D, 195; Re *Murphreysboro E.R.L.H. & P. Co.* (Ill.), P.U.R. 1927C, 523; Re *Van Auken Pub. Util. Plant* (N.H.), P.U.R. 1925A, 460; Re *St. Croix Gas L. Co.* (Me.), P.U.R. 1919A, 487; Re *Richfield Pub. Service Co.* (Idaho), *supra.*; Re *Rose* (Cal.), P.U.R. 1918C, 128.

² *Hackensack Water Co.* (N.Y.), P.U.R. 1917E, 106; Re *Winona Water Co.* (Ind.), P.U.R. 1920F, 968; Re *Farmers Fountain Tel. Co.* (Ill.) P.U.R. 1926C, 363; *White Oak L. H. & P. Co. v. Benson* (Pa.), P.U.R. 1916A, 811.

Restoration of service after temporary abandonment is usually made by permission of the commission in a manner similar to the granting of leave to render service.¹

A patron of a public utility has a right to insist upon continuance of service unless there is a valid reason for refusal to serve. The burden of proof is upon the company to justify discontinuance of service, and the reason should fall within those laid down in previous sections.²

¹ *Conrad v. Western Union Teleg. Co. (Ind.)*, P.U.R. 1920E, 499; *State v. Des Moines & Ft. Dodge R. Co.*, 84 Iowa 419, 51 N.W. 38; *Nairn v. Kentucky Heat Co.*, 27 Ky. L. Rep. 551, 86 S.W. 676.

² *Hollander v. Westchester L. Co.*, 79 Misc. 646, 140 N.Y. Supp. 544; *Waldron v. International Water Co.*, 95 Vt. 135, 112 Atl. 219; *Miday v. Barker*, 16 Idaho 73; *Wood v. Public Service E. & Gas Co. (N.J.)*, P.U.R. 1928B, 609; *Wagner v. Elwood Water Co. (Pa.)*, P.U.R. 1924A, 153; *Re Hagerstown (Ind.)*, P.U.R. 1927D, 262; *Ten Broek v. Miller (Mich.)*, P.U.R. 1928B, 369.

CHAPTER XXVII

OWNERSHIP OF EQUIPMENT

Connections, Instruments, and Equipment.—Just where ownership of equipment by the utility should end, and beyond which ownership should be vested in the customer, depends upon the policy adopted by the utility and state laws regulating ownership, and as the over-all costs may be considered, it makes little difference in the final result. A general rule governing this policy is the ability of the utility to recover the property in case of cessation of service by request of the customer and the location of the equipment on the customer's premises. The general practice is for the utility to own the meters; but there have been and still are numerous utilities, especially those municipally owned, that require their customers to purchase the meters. In lieu of ownership, such utilities sometimes charge a "meter rental," varying from a few cents to 25 cents per month. Comparing rates, therefore, requires a knowledge of meter rental, for a rental of 25 cents per month would be the equivalent of 1 cent per kwh extra when 25 kwh are used each month. Service wires extending from the electric distribution system to the customer's house are owned by the utility, and in some cases the lead-in wires from the point of attachment of service wires, through the wall and up to the meter. In this latter case, ownership of all equipment up to and including the meter is vested in the utility.

Gas utilities usually lay service pipes in the street up to the property line, the customer paying for the remainder of the pipe necessary to bring the gas into the basement of the building where the gas meter (owned by the utility) is located. In some instances, however, the pipes are extended from the main in the street to the inside of the building at the utility's expense. Some communities operating municipally owned utilities require payment for all service pipes by the customers and also, in some instances, payment for mains in the streets by "special improvement assessments" against the abutting property. Communities

operating water utilities usually require the customer to pay for the entire service extension from the main in the street to the inside of his building; in addition, the cost of laying mains in the streets is paid for by the owners of abutting property through "special improvement assessments," as in the case of municipally owned gas utilities. Large telephone systems usually own all equipment, including the wiring in the customer's buildings, on the theory that the quality of service depends upon the type of equipment used including the wiring connecting one telephone with another. Small, independent, and rural co-operative telephone systems do not all follow this practice; probably because certain classes of customers look more upon the monthly rental that follows than upon the initial outlay for equipment.

This matter of ownership, and the extent thereof, is important from the standpoint of rate comparisons, for when more equipment is owned by the customer there is less furnished by the utility; so, for the same rate of return to the utility, rates for service need not be as high. Regardless of ownership, the equipment should be safe and be so installed that property will not be damaged.¹

It is usually required that all services, mains, and equipment installed by the utility shall be maintained by it and at its expense. In the case of electrical connections and services, this rule holds for the double reason of ownership and danger from

¹ Re New York Tel. Co. (N.Y. 2d Dist.), P.U.R. 1916D, 688; Re Franksville Tel. Co. (Wis.), P.U.R. 1917A, 270; Consumers Co. v. Hatch, 224 U.S. 147; affirming 17 Idaho 204, 104 Pac. 670; Ex parte Goodrich, 160 Cal. 410, 117 Pac. 451; Re Dane County Rural Tel. Co. (Wis.), P.U.R. 1918B, 619; Re Pacific Gas & E. Co. (Cal.), P.U.R. 1923C, 385; Re Badger Tel. Co., 3 Wis. R.C.R. 98; Jordan v. Peoples Tel. Co. (S.D.), P.U.R. 1919C, 226; Re Springs Mutual Tel. Co. (S.D.), P.U.R. 1918A, 488; Re Gackle L. & P. Co. (N.D.), P.U.R. 1922B, 825; Mahoney v. Alton Water Co. (Ill.), P.U.R. 1921A, 692; Montgomery v. Greene, 180 Ala. 322, 60 So. 900; Re Reno L. & Water Co. (Nev.), P.U.R. 1917E, 765; Stein v. Consolidated Gas Co. (N.J.), P.U.R. 1916D, 80; Louisiana v. Louisiana Water Co. (Mo.), P.U.R. 1918B, 774; Belle Vernon v. Belle Vernon Water Co. (Pa.), P.U.R. 1923B, 193; Re Badger Util. Co. (Wis.), P.U.R. 1923B, 410; Janesville v. Janesville Water Co., 7 Wis. R.C.R. 628; Pasadena Consol. Water Co., 5 Cal. R.C.R. 180; Commercial Club v. Citizens Gas & Fuel Co. (Ind.), P.U.R. 1916E, 1; Re Portland Water Co. (Conn. 1934), 4 P.U.R. (N.S.) 265; Latta v. Medicine Valley Tel. Co. (S.D.), P.U.R. 1917E, 950; Re Swanson (Cal.), P.U.R. 1920E, 633.

shock to any person coming in contact with these lines. For rural lines, whether installed by the customers or by the utility, the utility usually assumes the maintenance, repairs, and replacements, performing this service and charging the customer for it, or doing it without charge, except in the revenue received from the sale of service.¹

The safety of all customers requires that the utility have the right to make an inspection of the premises of any customer to see whether his installation and equipment meet safety requirements and rules of the system before the final connections are made. Electrical companies must be assured that the equipment is capable of functioning at the voltage and frequency supplied and that the system shall be reasonably balanced between the phases. Gas companies have the burden of knowing that connections of heating appliances to the pipes are safe for the customers. Telephone companies forbid customers to connect equipment to their telephones or lines whether on or off the premises of the customer, because of possible impairment of service or the securing of additional use without proper compensation.²

The problem of whether more than one customer should receive service through a single connection or whether more than one customer should have service through one meter is often met in rate proceedings, because its solution affects the total charge when schedules are based on blocks, steps, minimum bills, and service charges. From the service angle, separate installations and meters to each consumer and one meter to a customer are usually preferred, although there are exceptions to this

¹ *Re Kingston Tel. Co. (Wis.)*, P.U.R. 1915D, 839; *Link v. Litchfield*, 31 Ill. App. 118; *Ellendale Nat. Bank v. Ellendale E. Co. (N.D.)*, P.U.R. 1926D, 603; *Johnson v. H. L. Nay Tel. Line (Cal.)*, P.U.R. 1921C, 337.

² *La Crosse v. Wisconsin-Minnesota L. & P. Co. (Wis.)*, P.U.R. 1915C, 421; *Re Jenkins (Pa.)*, P.U.R. 1915C, 985; *State ex rel. W. J. Armstrong Co. v. Waseca*, 122 Minn. 348, 142 N.W. 319; *Elevators Manufacturing Ass'n v. New York & Queens L. & P. Co. (N.Y. 1st Dist.)*, P.U.R. 1917C, 152; *Re Commonwealth Edison Co. (Ill.)*, P.U.R. 1920B, 700; *Bismarck Elevator & Investment Co. v. Hughes E. Co. (N.D.)*, P.U.R. 1920F, 915; *Hotel Statler v. New England T. & T. Co. (Mass.)*, P.U.R. 1927B, 579; reversed in *New England T. & T. Co. v. Department Pub. Util.*, 262 Mass. 137, 159 N.E. 743, P.U.R. 1928B, 396; *Cape Girardeau v. Missouri Pub. Util. Comm. (Mo.)*, P.U.R. 1930D, 126; *Re Citizens Gas & Fuel Co. (Ind.)*, P.U.R. 1922E, 571; *Frank v. Paducah Water Supply Co.*, 88 Ky. 467, 11 S.W. 432; *Pocatello Water Co. v. Standley*, 7 Idaho 155, 61 Pac. 518.

practice. . . . The word "customer" has been defined as (a) a building under one roof owned by one party and occupied as one business or residence, or (b) a combination of buildings owned by one party and one common enclosure occupied by one family or business or (c) the one side of a double house having a solid vertical partition wall, or (d) a building of more than one apartment owned by one family and using in common one hall and one entrance, or (e) a building owned by one party having a number of apartments and using one hall and one or more means of entrance.—*Supervision Co. v. Public Service E. Co. (N.J.)*, P.U.R. 1922D, 555.¹

Meters and Meter Connections.—Except in the case of flat rates for service, such as those for street railways and telephones in general, and in the case of metered service for telephones, all service must be metered on the premises of the customer. These meters must be read by employees of the utility, usually monthly. For this purpose, access must be had to that part of the premises where the meter is located. Repairs for these meters and their service connections must be made by the utility. Not only is the use of meters more equitable and less discriminatory as among different customers of a given class, but their use tends to reduce loss to the utility by wastage of the service which is found to take place when no meter is used.²

"The New York Commission adopted a rule requiring electric utilities to test average 10-ampere meters every 72 months instead of every 60 months as was previously required. Also, that electric utilities

¹ *Young v. Boston*, 104 Mass. 95; *Montgomery v. Greene*, 180 Ala. 322, 60 So. 900; *Hallett v. Seattle L. Co.*, 60 Wash. 81, 110 Pac. 799; *Moebus v. Butte Water Co. (Mont.)*, P.U.R. 1919A, 573; *American Steel Foundries Co. v. Northern Indiana Gas & E. Co. (Ind.)*, P.U.R. 1925A, 232; *Lewis v. Potomac E. Co. (D.C.)*, P.U.R. 1930B, 147.

² *Public Service Corp. v. American L. Co.*, 67 N.J. Eq. 122, 57 Atl. 482; *Albert v. Davis*, 49 Neb. 579, 68 N.W. 945; *East Bakersfield Improvement Ass'n v. San Joaquin L. & P. Co. (Cal.)*, P.U.R. 1916C, 830; *Manufacturers Ass'n v. Public Service E. & Gas. Co. (N.J.)*, P.U.R. 1929A, 54; *Re Exeter Gas L. Co. (N.H.)*, P.U.R. 1929E, 55; *Public Service Comm. v. Lehighton Water Supply Co. (Pa.)*, P.U.R. 1929E, 118; *Re Muncie E. L. Co. (Ind.)*, P.U.R. 1918B, 194; *Redding v. Northern California P. Co. (Cal.)*, P.U.R. 1916F, 801; *Re Standards for Electric Service (Mich.)*, P.U.R. 1931C, 398; *Re Watt-hour Meters (D.C.)*, P.U.R. 1917B, 473; *Re Standards for Testing Meters (N.Y.)*, P.U.R. 1917E, 355; *C. L. Dooley Co. v. Brooklyn Edison Co. (N.Y.)*, P.U.R. 1923B, 385; *Glenn v. Mohawk Edison Co. (N.Y.)*, P.U.R. 1920C, 184.

should not put into service meters failing to register between 100 per cent accuracy and 2 per cent slow at light and full loads. Chairman Maltbie said: 'According to present rules, a meter may be placed in service although registering 101 per cent of the energy passing through it; and if it is so registering, it is considered to be accurate. In other words, a company may put meters in service that are too fast. It may also put meters in service that are slow up to 1 per cent. But as there is every inducement for company employees not to put meters into service that are slow, and as the Commission does not verify the tests made by the companies, there is no guaranty that company employees do not yield to the inevitable temptation to err on the side favorable to their employers, viz., to pass meters that are fast, while readjusting those meters that are slow. Under such conditions it is asking too much of human nature to expect an equal division of fast and slow meters. The second important fact is that alternating current meters tend to become fast and that direct current meters tend to become slow. However, the most important factor is the effect on public relations. Consumers are too prone to believe that companies will take every advantage possible, and a regulation that permits meters to be placed in service when fast is open to obvious criticism.'" *Re Testing of Watt-hour Meters of Electric Corp.* (N.Y. 1934), 2 P.U.R. (N.S.) 367. "The reason given for locating the meters on the outside of the building are, that by having the meters on the outside of the building the meter readers can read the meters each month without gaining access to the customer's home; the meter testers can carry on their work likewise; also, the defendant is experiencing a large amount of loss in current because of diversion of the current by many of the consumers. The manager states that the installation of the meter on the outside of the complainant's residence is in conformity with its regular planned program of locating all customers' meters on the outside of buildings." *Rose v. Missouri Pub. Service Co.* (Mo. 1935), 10 P.U.R. (N.S.) 405.

CHAPTER XXVIII

SERVICE BY PARTICULAR UTILITIES

Electric Utilities.—Adequate service from electrical utilities includes not only proper voltage and frequency regulation, freedom from interruptions, and proper maintenance, but also the ability of the utility to take on additional lighting and power customers, as may be required by the growth and change in the size and character of the communities served. The maintenance of satisfactory voltage at a customer's premises often becomes quite expensive. If the voltage under no-load conditions is 115, it will fall below this value as soon as any load is connected, the reduction in voltage being dependent upon the amount of current drawn. If the variation is 10 volts and this variation is to be reduced to 5 volts, it will be necessary to install electric conductors twice as heavy, up to the point where some other means is adopted to reduce the variation. Hence, in comparing rates charged by utilities in different cities, the voltage variation (referred to in trade terms as "voltage regulation") is very important. An increase in load, in small communities especially, may require considerable increase in investment caused by changes in the transmission line supplying the community. An electric utility, deriving its source of power from hydroelectric plants, is usually required to have a stand-by steam plant of capacity equal to the total demand of the system less the dependable capacity of the hydroelectric plants, and this steam plant must be in constant readiness to carry the added load caused by an interruption of supply from the hydroelectric plants. A steam station should not put its reliance in a single unit but should have at least two units, each of which can carry the demand in cases of accident to the other unit. In a large interconnected system, service from a given hydroelectric plant may be on a "firm-power" or on a "dump-power" basis. The firm-power basis is that available at all times such as would be given by minimum flow conditions from a hydroelectric plant. "Dump-

power" service is that power which is furnished from hydro-electric plants to avoid wastage of water after heavy rainfall. In order to use such energy, the plant must be connected to a large transmission system capable of absorbing it at the time it is available. The requirement for quality of service is much greater in respect to reliability for firm power than for dump power.

It is desirable that the customer's load should have good power factor and low starting current; but a requirement for the installation of particular equipment, such as synchronous motors or capacitors for poor power factor loads, is best brought about by the use of a power factor clause in the rate structure rather than by rules of the utility. It is seldom that the same quality of service can be delivered in small cities or over rural lines as is to be expected in the larger cities. "Breakdown" service to private electric plants is sometimes required to be supplied except where the plant is a competitor of the utility.¹

Gas Utilities.—Important matters to be considered in the service of gas utilities are the heating value of the gas as measured by the number of Btu per cubic foot, maximum and minimum pressure of the gas at the customer's premises, quality of the gas as to its purity, and reliability of the service. Natural gas averages high in the number of heat units per cubic foot, whereas manufactured gas has a much lower standard. The standard of quality and heat content of natural gas remains fairly constant from a given field; that of manufactured gas must be maintained

¹ *Croukshank v. New York Edison Co.*, 4 P.S.C. N.Y. (1st Dist.) 255; *Smith v. De Tienne (Mo.)*, P.U.R. 1917C, 24; *Siegfried v. Washington E. Co. (N.J.)*, P.U.R. 1919A, 588; *Re Eastern Montana L. & P Co. (Mont.)*, P.U.R. 1921B, 568; *Re Community P. & L. Co. (N.J.)*, P.U.R. 1926A, 536; *Young v. Davis Mill & E. Co. (Wis.)*, P.U.R. 1932A, 478; *Re Tucson Gas E. L. & P. Co. (Ariz.)*, P.U.R. 1932C, 127; *Re Town of Commonwealth (Wis. 1934)*, 2 P.U.R. (n.s.) 379; *Re E. Ill. Co. of Boston (Mass. 1934)*, 5 P.U.R. (n.s.) 369; *Re Central Illinois L. Co. (Ill.)*, P.U.R. 1919A, 573; *Seattle E. Co. v. Snoqualmie Falls P. Co.*, 40 Wash. 380, 82 Pac. 713; *Re Marshall L. & P. Co. (Ill.)*, P.U.R. 1922A, 261; *Re New York State Gas & E. Corp. (N.Y. 1934)*, 5 P.U.R. (n.s.) 409; *Re Commonwealth Edison Co. (Ill.)*, P.U.R. 1920B, 700; *Re San Joaquin L. & P. Corp. (Cal.)*, P.U.R. 1922D, 595; *Re Truckee River P. Co. (Nev.)*, P.U.R. 1927C, 692; *Re Evansville Water & L. Comm. (Wis.)*, P.U.R. 1927D, 201; *Re Marshfield Water L. & P. Co. (Wis.)*, P.U.R. 1931A, 235; *Cape Girardeau v. Missouri Pub. Util. Co. (Mo.)*, P.U.R. 1930D, 126; *Re Iron River Water L. & Tel. Co. (Wis.)*, P.U.R. 1928C, 93.

constant by proper treatment at the plant. Mixed gas, formed by mixing natural and manufactured gas, is common where the utility distributing the gas is situated at the end of a long pipe line extending from the natural-gas field. The natural gas is sometimes used as an enricher of manufactured gas; the number of heat units being intermediate between that of the manufactured and natural. It is more economical to distribute this mixed gas because the company can, during a failure in the supply of natural gas, enrich the manufactured gas by means of high-grade oils to the standard of the mixed gas. This may be necessary when the pressure of the natural gas falls owing to severe overloads on the system caused by heating loads during severe winter weather or accidents to the pipe line.¹

Water Utilities.—The important considerations in a water utility are the matters of health and fire protection. The first of these requires water free from injurious bacteria and vegetable matter; the second requires mains of adequate capacity to supply water in sufficient quantity for fire protection. Satisfactory service after these requirements have been met becomes one of maintaining adequate pressure at all times, although this is not so important as voltage of electrical utilities or pressure of gas. A low pressure means that additional time is required to secure a given amount of water. During dry seasons when lawns are being sprinkled, the water pressure in a given area may fall to such a low point that persons on the second and third floors of buildings cannot get water at all. Such service cannot be considered as being satisfactory. It can be corrected by installing larger mains and pumps.

Telephone Utilities.—Ability to talk to another person at some distance without being obliged to wait and the ease with which

¹ Public Service Comm. v. Seattle Gas Co. (Wash.), P.U.R. 1920B, 488; Landon v. Court of Industrial Relations, 269 Fed. 433, P.U.R. 1921A, 807; Re Flint (Mich.), P.U.R. 1922A, 385; Consolidated Gas Co. v. Prendergast, 6 F. (2d) 243, P.U.R. 1925B, 773; Re Illinois Gas Ass'n (Ill.), P.U.R. 1925D, 16; New York & Richmond Gas Co. v. Prendergast, 10 F. (2d) 167, P.U.R. 1926B, 759; Re Missouri Natural Gas Co. (Mo.), P.U.R. 1929B, 465; Re Peoples Gas L. & Coke Co. (Ill.), P.U.R. 1931E, 457; Re Calumet City Pub. Service Co. (Ill.), P.U.R. 1932A, 159; Re Nashville Gas & H. Co. (Tenn.), P.U.R. 1932A, 270; Public Service Comm. v. Billings Gas Co. (Mont.), P.U.R. 1926D, 777; Re Standards for Gas & E. Service, 2 Wis. R.C.R. 632.

conversation can be carried on are the two important elements of good service. The first of these requires switching and connecting equipment of such size as to function adequately during the periods when the number of calls is the most frequent. The second requires instruments which, in conjunction with the connecting circuits, respond equally well to all the voice frequencies. Since these frequencies vary all the way from a few hundred per second to several thousand, the difficulty of obtaining this optimum condition can readily be imagined. Unequal response to different frequencies by transmitters and receivers, otherwise known as "distortion," can be partly overcome by electrical networks inserted between two instruments, which depress the amplitude of those frequencies which respond most readily in the instruments and then amplify the final to the desired amount. The natural tendency of long transmission lines is to reduce the amplitudes of the higher frequencies more than the lower; to offset this tendency, equipment having the opposite tendency is inserted at the terminals and at intermediate points of the line.

For practical purposes, it is not necessary to consider the entire voice frequency range. A system that will transmit frequencies from 300 or 400 to 2,000 cycles per sec gives good practical results. Another factor is the noise entering telephone circuits by induction from near-by electric power lines and also the humming caused by the overhead conductors themselves. Since amplifiers cannot amplify the voice frequencies without at the same time magnifying the noise frequencies in the same range, it is important to shield or transpose telephone wires to reduce this noise as much as possible and also to have more powerful transmitters. In the latter instance, the volume of the noise is a much smaller percentage of the volume of the voice currents and hence not so noticeable. Therefore, a good transmitter is highly desirable.

Conclusion.—Good service today may not be considered as such tomorrow. Service is good or bad by comparison. There are, however, certain items that are bad or good without comparison. For example, flickering lights are bad regardless of whether or not the lights in every community in the country flicker in the same manner. A telephone system that does not permit an ordinary conversation with ease is certainly not rendering good service. Likewise, a gas utility has poor service when

there are such great variations in pressure that the chef must be constantly at the stove to watch the size of each gas flame. In consideration of these matters, the management should give service of as good quality as the revenue received will permit, remembering that perfect service is the goal to be reached and that poor service regardless of how low the rates, will not prevent dissatisfied customers.

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